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Drexel Institute

OF

Art, Science, and Industry

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OF THE

Departments and Courses of Instruction

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DREXEL INSTITUTE
OF ART, SCIENCE, AND INDUSTRY

INTRODUCTION

The Drexel Institute was founded in 1891, by Anthony J. Drexel, for the promotion of education in art, science, and industry. The chief object of the Institute is the extension and improvement of industrial education as a means of opening better and wider avenues of employment to young men and women. In accordance with the founder's desire, however, the plan of organization has been made comprehensive, providing liberal means of culture for the masses by means of evening classes, free lectures and concerts, the library, and the museum.

The building was dedicated with appropriate ceremonies, December 15, 1891. A beginning was made in some of the departments in February, 1892, and in September of the same year work was regularly begun in most of the departments included in the general scheme of instruction.

The Institute is situated on Chestnut street, at the corner of Thirty-second street. This location was chosen as being the most central and the most convenient of access from all parts of the city. It is at a point near where a number of the principal highways converge; within easy reach of three or four main lines of street railways; but four squares from Powelton Avenue station; three squares from South Street station, and a few squares from the Baltimore and Ohio station.

The founder's gifts to the institution, as a whole, amount to three million dollars. Of this sum, one million has been expended upon the buildings with their equipments and appliances. The endowment fund of two millions of dollars is applied in maintaining the instruction. This enables the Institute to offer the instruction at extremely moderate and, in some cases, nearly nominal rates. There is also a number of free scholarships for deserving students.

The Institute is open to both sexes on equal terms. Students are recommended to enter regularly one of the departments or courses, but the same liberal opportunities are provided for those taking special or elective courses. Regular attendance and strict attention to the studies and training undertaken are expected of every student, and no one will be allowed to continue who is not making good use of the facilities offered.

The Evening Classes, which are open for six months of the year, from October to March, inclusive, offer instruction and training of the same kind and character, and with all the advantages of the extensive appliances and apparatus, as the instruction and training given in the day classes and at much lower rates. Systematic courses in all the departments of the Institute are organized for the benefit of the evening students, and certificates are granted to those who finish these courses and pass the required examinations.

Besides the instruction provided in the several educational departments, the Institute carries on a large and important work through the means of the Free Public Lectures and Concerts which are given during the winter months. These lectures aim to furnish opportunities for general culture to the public at large, a work in which the Library and Museum are also made to co-operate. During the past year, the attendance at the lectures and concerts has been more than thirty-six thousand.

In the administration of the Institute, every effort is made to bring the opportunities for improvement, which are so liberally provided, within the reach of the largest possible number.

THE BUILDING

The Institute building is in the style of the classic Renaissance, or what would be better described as a modern interpretation of Greek forms. This gives assurance of its purity of spirit and explains the impression it makes as a harmonious whole. Even the colors of the marble used are in harmony with the scheme of decoration, which consists chiefly of buffs and reds. The Greek motives are met with in almost everything about the building, even to the bronze electric light fixtures which were specially designed for the Institute. Additional beauty is lent to the exterior by the ornamental terra-cotta work. The façade on Chestnut street is broken in the middle by an attic story which projects above the roof of the structure proper. This is the center of the ornamentation, for here the wide frieze which extends around the building between the second and third stories meets above the lofty archway.

The portal, which is the main entrance, is twenty-six feet wide at the base and rises to a height of thirty-five feet. The decoration of the arch is elaborate and is made doubly interesting by the addition of a series of finely executed high-relief medallion portraits: Bach, representing music; Raphael, painting; Goethe, poetry; Columbus, navigation; Newton, mathematics; Faraday, physics; Humboldt, natural history; Jefferson, government; Galileo, astronomy; Shakespeare, drama; Michael Angelo, sculpture; William of Sens, architecture. In the spandrels of the arch are medallions of Apollo and Moses.

The central object of the arch is a figure representing the Genius of Knowledge. Above her, in the frieze, is a tablet bearing the words, "Drexel Institute." Another finely designed frieze extends across the attic.

ANNEXES

The rapid growth of the Institute has rendered necessary the acquisition of outside accommodations for several of the important lines of work. Temporary quarters have been secured in the immediate neighborhood of the Institute building, as follows:—

Annex No. 1. A building on Chestnut street, immediately east of the Institute building, which has been remodeled and enlarged so as to furnish classrooms, studios, workshops, etc., for several of the departments.

Annex No. 2. A row of houses on Thirty-second street, opposite the Institute building, in which a number of rooms have been fitted up for laboratories and classrooms, chiefly in connection with the Electrical and Mechanical Engineering courses.

This Annex also contains the students restaurant, which is managed by the Director of the Courses in Domestic Science.

THE GREAT COURT

Beyond the entrance-hall is the great central court, sixty-five feet square, the entire height of the building, and covered with a decorated ceiling, the center of which is filled with stained glass. At the farther end of the court is the double marble stairway, ascending to the upper stories and descending to the auditorium and to the workshops in the basement. The stairway is flanked by a pair of magnificent bronze and gilt candelabra, supported by marble pedestals and fitted with electric lamps. Arcades support and enclose the broad galleries which run around the court on the second and third floors. From these galleries open the classrooms, laboratories, and studios, all of which are lighted from the exterior of the building. There is thus a free circulation of light and air throughout the entire building. The portico, entrance-hall, and central court are wainscoted in marble; the arcades are faced with enameled bricks, and the dividing cornices are of terra-cotta; the woodwork throughout the building is of polished oak.

THE AUDITORIUM

The auditorium is reached from the great court by the marble stairway, besides which there is an entrance on Thirty-second street. This hall is capable of seating fifteen hundred persons. On the stage is the organ which, with the screen, is decorated in the style of the Italian Renaissance. Doorways lead from the stage on both sides to the retiring-rooms. Over one is the name of Bach, and above it is a scroll inscribed with a chord from one of his scores; a similar specimen of Handel's music ornaments the other doorway. On the south wall of the room, in the recessed arches, are inscribed the names of the great leaders of thought and culture: Aristotle, Dante, Michael Angelo, Shakespeare, Beethoven, Washington, Gutenberg, Galileo, Franklin, Watt, and Darwin.

LIBRARY AND READING-ROOM AND MUSEUM

On the first floor, opening from the entrance-hall, are the offices, the Library and Reading-room, and the Museum.

The Library and Reading-room is a fine apartment one hundred and twenty feet long by sixty feet wide. It contains about twenty-four thousand volumes, and is supplied with the leading American and European periodicals relating to art, science, and technology.

The collections of the Museum embrace specimens in every department of industrial art. The decorative arts of Egypt, India, China, Japan, and Europe are well represented. No gallery has yet been provided for the collection of paintings bequeathed to the Institute by its founder; but they are distributed throughout the building so as to be accessible to the students and the public.

LECTURE-HALL, LABORATORIES, STUDIOS, AND CLASSROOMS

The Lecture-hall, opening from the central court, has chairs for three hundred students, and is equipped with every appliance necessary for scientific experiments.

On the second, third, and fourth floors, and in the basement, are the classrooms, studios, and workshops. The physical laboratories are situated on the second floor, the chemical laboratory is on the third floor, the shops and laboratories for mechanical and technical work are in the basement.

GYMNASIUM

The Gymnasium, in the fourth story of the front of the building, is a large, airy, and well-lighted apartment, and is entered by hallways on the third floor. Connected with the entrances to the gymnasium are the bath-rooms, fitted with marble compartments and supplied with hot and cold water. The lockers, coat-rooms, and lavatories are placed in all four stories of the building.

HEATING, LIGHTING, AND VENTILATION

In the basement are the extensive steam, mechanical, and electric plants.

Great attention has been paid to the heating and ventilation of the building, and it is lighted throughout by electricity. For the latter purpose, about twenty-five hundred incandescent lamps are required. The annexes are supplied with heat and light from the Institute building. The entire building is fitted with the Johnson self-regulating heating apparatus, which secures an equable temperature at all times throughout the court, corridors, halls, classrooms, studios, laboratories, and workshops.

DEPARTMENTS

The Institute is organized in the following Departments:

I. DEPARTMENT OF FINE AND APPLIED ART.
II. DEPARTMENT OF MECHANIC ARTS.
III. DEPARTMENT OF SCIENCE AND TECHNOLOGY.
IV. DEPARTMENT OF COMMERCE AND FINANCE.
V. DEPARTMENT OF DOMESTIC SCIENCE AND ARTS.
VI. NORMAL DEPARTMENT FOR THE TRAINING OF SPECIAL TEACHERS.
VII. DEPARTMENT OF PHYSICAL TRAINING.
VIII. DEPARTMENT OF EVENING CLASSES.
IX. FREE EVENING CLASSES IN CHORAL MUSIC, FROM OCTOBER 1 UNTIL APRIL 1.
X. DEPARTMENT OF FREE PUBLIC LECTURES AND CONCERTS.
XI. LIBRARY DEPARTMENT, AND SCHOOL FOR THE TRAINING OF LIBRARIANS.
XII. MUSEUM DEPARTMENT.

While each department is organized with reference to its special objects and courses of instruction, it sustains important relations to the other departments, and the various lines of work are carried on in so broad a spirit as to give a certain unity of purpose to the scope and ends of the institution as a whole.

BOARD OF TRUSTEES

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Secretary,

GEORGE C. THOMAS.

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William V. McKean,
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Until Third Thursday in October, 1900.

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Richard C. Dale,
Anthony J. Drexel,
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Until Third Thursday in October, 1901.

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MRS. ALEXANDER VAN RENSSELAER.

Secretary,

MISS MARY DULLES.

Until last Tuesday in October, 1899.

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Mrs. Anthony J. Drexel, Mrs. E. D. Toland,
Mrs. J. G. Watmough.

Until last Tuesday in October, 1900.

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Until last Tuesday in October, 1901.

Mrs. A. W. Biddle, Mrs. George W. C. Drexel,
Mrs. J. Bellanger Cox, Miss Mary Dulles,
Mrs. Charles B. Penrose.

OFFICERS OF INSTRUCTION AND ADMINISTRATION

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President of the Institute.

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Professor of Chemistry.

WILLIAM J. HOPKINS, S. B.,
Professor of Physics.

——————————,
Professor of Mechanical Engineering, and Director of the Courses in Mechanical Drawing.

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Director of the Department of Mechanic Arts, and Professor of the Theory and Practice of the Steam-Engine.

CHARLES H. WHEELER, PH. B.,
Professor of Mathematics.

ALBERT P. BRUBAKER, M. D.,
Professor of Physiology and Hygiene.

ARTHUR J. ROWLAND,
Professor of Electrical Engineering.

PARKE SCHOCH, A. M.,
Director of the Department of Commerce and Finance; and Professor of the History and Mechanism of Commerce, and Stenography.

CLIFFORD P. GRAYSON,
Director of the School of Drawing, Painting, and Modeling.

HOWARD PYLE,
Director of the School of Illustration.

ARTHUR TRUSCOTT,
Professor of Architecture.

JAMES L. WOOD,
Instructor in Drawing from the Antique and in Artistic Anatomy, and Lecturer on The History of Art.

HOWARD S. RICHARDS, B. S.,
Professor of Building Construction.

JOHN J. DULL,
Professor of Architectural Drawing and Design.

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Director of the Courses in Domestic Science.

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Chief Instructor in English Language and Literature.

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Assistant Professor of Architecture.

CALIXTO GUITÉRAS, C. E.,
Professor of Spanish.

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Instructor in Mathematics.

ANNIE P. SHEDDEN,
Instructor in English and History.

ABRAHAM HENWOOD,
Instructor in Chemistry.

ELIZABETH L. BLOOMFIELD,
Instructor in Drawing.

ALICE J. MORSE,
Director of the Course in Design and Decoration.

JOHN TODD HILL,
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Instructor in Architectural Drawing.

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CAROLINE L. T. BURGESS,
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J. PETERSON RYDER, S. B.,
Director of Physical Training.

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Associate Professor of Commercial Geography and Banking.

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Instructor in Cookery.

MARGARET C. LIMERICK,
Instructor in Cookery.

HARRIET E. GAYLEY,
Instructor in Cookery.

EMILY GRACE SWETT,
Instructor in Millinery.

EMILY A. LITTLEFIELD,
Instructor in Millinery.

ISABEL J. ROBERTS,
Instructor in English.

MARY E. FRATZ,
Instructor in Drawing.

CORINNE M. ROCKWELL,
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Instructor in Electrical Engineering.

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Instructor in Mechanical Drawing.

OSCAR C. SCHMIDT,
Instructor in Mechanical Drawing.

MARY E. EASTWOOD,
Instructor in Dressmaking.

MARY L. SARGENT,
Instructor in Dressmaking.

——————————,
Instructor in Dressmaking.

BERNHARDT HAUG,
Instructor in Mechanical Drawing.

WILLIAM LESEUR HAYNES,
Instructor in Mechanical Drawing.

GEORGE W. IRONS,
Instructor in Mechanical Drawing.

BERTRAND JOHNSON,
Instructor in Electrical Engineering.

THOMAS McCREIGHT,
Instructor in Forging.

R. WILLETTE CLINGER,
Instructor in Woodwork.

CLEMENT E. MOSSOP,
Instructor in Bench-work in Iron.

STUART B. MOLONY,
Assistant in Physical Laboratory.

FREDERICK L. LEWTON,
Instructor in Chemistry.

FANNIE K. WARDELL,
Instructor in Cookery.

JENNIE COLLINGWOOD,
Instructor in Dressmaking.

MARY C. DAVIS,
Instructor in Dressmaking.

MARY H. BROWN,
Instructor in Dressmaking.

ELLA K. SCHOCH,
Instructor in Stenography.

PHEBE CHEYNEY,
Instructor in Physical Training.

FRANK M. OLIVER,
Attendant in the Chemical Laboratory.

CHARLES M. SCHMITZ,
Director of Music.

JAMES M. DICKINSON,
Organist.

LIBRARY

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Librarian, and Director of the Library School.
SARAH W. CATTELL,
Assistant Librarian, and Instructor in the Library School.
——————————,
Assistant Librarian, and Instructor in the Library School.
MARY HEY SHAFFNER,
Assistant Librarian.
FRANCES C. PORTER,
Evening Assistant.
MARY S. OLIVER,
Library Attendant.

MUSEUM

MARY T. MAC ALISTER,
Curator of the Museum.

OFFICES

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Registrar.
ELIZABETH E. UPTON,
Clerk, Registrar's Office.
JEANIE N. GOODSPEED,
Clerk, Registrar's Office.
ADÈLE M. SMITH,
President's Secretary.
MARY L. HENRY,
Clerk in charge of Supply-room.
E. THERESE GREGG,
Superintendent of the Students Restaurant.

BUILDINGS

WILLIAM A. FLETCHER,
Chief Engineer and Superintendent of Buildings.
ROBERT J. McGOWAN, } Janitors.
FRANK H. A. NIBLETT, }

DEPARTMENTS

AND

COURSES OF INSTRUCTION

DEPARTMENTS

The Institute is organized in the following Departments:—

I. DEPARTMENT OF FINE AND APPLIED ART

School of Illustration.
School of Drawing, Painting, and Modeling.
Course in Design and Decoration. Three years.
Course in Architectural Drawing. Two years.

II. DEPARTMENT OF MECHANIC ARTS

Three Years' Systematic Course in Mathematics, Mechanical Drawing, Free-hand Drawing, Science, English Language and Literature, History, Civics, Shop-work in Wood and Iron, Applied Electricity.

III. DEPARTMENT OF SCIENCE AND TECHNOLOGY

Course in Electrical Engineering. Two years.
Course in Machine Construction. Two years.
Course in Mechanical Drawing. Two years.
Special Courses in Mathematics, Physics, Chemistry.

IV. DEPARTMENT OF COMMERCE AND FINANCE

General Course in Commerce and Finance. Two years.
Commercial Course for Teachers. One year.
Office Courses in Bookkeeping, Stenography, Secretary Work. One year each.

V. DEPARTMENT OF DOMESTIC SCIENCE AND ARTS

Junior Course in Domestic Science and Arts. Two years.
Advanced Elective Courses in Domestic Science and Arts.
Special Courses in Household Economy and Cookery.
Normal Course in Domestic Science. Two years.
Normal Course in Domestic Arts. Two years.
Courses in Dressmaking.
Courses in Millinery.

VI. NORMAL DEPARTMENT FOR THE TRAINING OF SPECIAL TEACHERS

Manual Training, Commercial Instruction, Domestic Science (Cookery and Household Economics), Domestic Arts (Sewing, Dressmaking, and Millinery).

VII. DEPARTMENT OF PHYSICAL TRAINING

Special Courses for Young Men and Young Women.

VIII. DEPARTMENT OF EVENING CLASSES

Courses in all the Departments of the Institute.

IX. FREE EVENING CLASSES IN CHORAL MUSIC

X. DEPARTMENT OF FREE PUBLIC LECTURES AND CONCERTS

Courses of Lectures in Art, Science, and Technology.
Organ Recitals and Concerts during the winter months.

XI. LIBRARY DEPARTMENT

The Library contains twenty-four thousand volumes. Open free to the public daily, except Sunday.
School for the Training of Librarians, in connection with the Library.

XII. MUSEUM DEPARTMENT

The Museum, containing valuable and important collections of textiles, wood-carvings, metal-work, ceramics, casts, paintings, drawings, prints, etc., is open free to the public daily, except Sunday.

While some of the courses are specially designed for either young men or young women and are quite distinct in their arrangement and management, all the general courses are open to both sexes, on the same terms and conditions.

The academic year is divided into two terms, beginning in September and February, respectively.

The Evening Classes begin October 1st, and close March 31st.

DEPARTMENT OF FINE AND APPLIED ART

INSTRUCTORS

Howard Pyle, Director of the School of Illustration.

Clifford P. Grayson, Director of the School of Drawing, Painting, and Modeling; Life Classes.

James L. Wood, Drawing from the Antique and Artistic Anatomy.

Arthur Truscott, Professor in charge of the Course in Architectural Drawing.

Alice J. Morse, Director of the Course in Design and Decoration.

John Todd Hill, Modeling in Clay and Wood-Carving.

Elizabeth L. Bloomfield, Instructor in Drawing.

Howard S. Richards, B. S., Professor of Building Construction.

John J. Dull, Professor of Architectural Drawing and Design.

Prescott A. Hopkins, M. S., Assistant Professor of Architecture.

Herman L. Duhring, Instructor in Architectural Drawing.

Hélène Zogbaum, Instructor in Design in Dressmaking and Millinery.

Mary E. Fratz, Instructor in Drawing.

James L. Wood, Lecturer on The History of Art.

Corinne M. Rockwell, Secretary of the Department.

The Department is organized as follows:—

School of Illustration.
School of Drawing, Painting, and Modeling.
Course in Clay Modeling.
Course in Wood-Carving.
Course in Design and Decoration.
Course in Architectural Drawing.

SCHOOL OF ILLUSTRATION

HOWARD PYLE, Director.

The School of Illustration comprises the following classes:—

FIRST CLASS.—LIFE CLASS STUDYING FROM THE DRAPED AND COSTUMED MODEL. In this class, departing essentially from the ordinary work of academic schools in studying from the living figure, the model is costumed and posed in some suggestive action, and the student is instructed to draw the figure that it may be introduced into a picture.

The First Class is preparatory to the higher branches of instruction in the art of illustrative painting.

SECOND CLASS.—CLASS IN ILLUSTRATION. In this class, the student is taught to paint the draped and costumed model with such necessary changes of light and shade and surroundings as shall make of the work a finished picture, either for purposes of reproduction or more elaborate rendition in full color.

THIRD CLASS.—CRITICAL LECTURES IN PRACTICAL ILLUSTRATION.

These lectures by Mr. Pyle are for the purpose of instructing the student in the necessary requirements for converting the study of the draped and costumed model into a finished picture. They are given twice a week, and are divided as follows:—

I. Composition, in which the pupil acquires a knowledge of the principles governing the grouping and arrangement of figures and backgrounds necessary for the creation of a picture.

II. Facial Construction, in which the student acquires a knowledge of the construction of the head and face, as well as of the varied expressions of the countenance.

III. Costume. Instruction in the various costumes of different periods, especially of American life, and the drawing of the human figure without the assistance of the model.

REQUIREMENTS FOR ADMISSION

FIRST CLASS.—Applicants must submit a study of a head or of a life figure painted in oil.

SECOND CLASS.—Applicants must submit a study in oil, either in monochrome or full color, of the draped or costumed model, or else an illustration that has been published in a book, magazine, or an illustrated newspaper.

THIRD CLASS.—Applicants must submit an original drawing or a reproduction of published work.

SCHOOL OF DRAWING, PAINTING, AND MODELING

CLIFFORD P. GRAYSON, Director.

FIRST CLASS

DRAWING FROM GEOMETRIC SOLIDS.

CAST DRAWING FROM SIMPLE ORNAMENT.

FREE-HAND AND LINEAR PERSPECTIVE.—Lectures and problems.

DRAWING.—Still-life and interiors.

FREE-HAND SKETCHING FROM OBJECTS.

DRAWING FROM CASTS OF HANDS, FEET, AND SIMPLE MASKS.

CLAY MODELING.—Lines, symmetry, ornament.

SECOND CLASS

CAST DRAWING FROM COMPLICATED ORNAMENT.

DRAWING FROM CASTS OF PARTS OF HUMAN FIGURE AND ANIMALS.

ANTIQUE BUST AND TORSO.—Drawing and monochrome in oil.

ANTIQUE DRAWING.—Full-length figure.

DRAWING FROM LIFE.

SKETCHING FROM OBJECTS.—Pencil and crayon.

ARTISTIC ANATOMY.—Lectures and drawings.

CLAY MODELING.—Value of planes studied from casts of natural foliage and parts of human figure.

THIRD CLASS

DRAWING FROM FULL-LENGTH ANTIQUE.

DRAWING FIGURE FROM LIFE.

PAINTING FROM LIFE.—Head and costumed figure.

PAINTING IN OIL AND WATER-COLOR.—Still-life.

SKETCHING.—From costumed figure.

LECTURES ON COMPOSITION.

CLAY MODELING.—Full-length figure, torso, and head from casts.

FOURTH CLASS

DRAWING FIGURE FROM LIFE.

PAINTING FROM LIFE.—Full figure.

PORTRAIT PAINTING.

COMPOSITION AND SKETCHING.

CLAY MODELING.—Bust, bas-relief, and full figure from life.

The lectures on composition during the third year are given by Mr. Howard Pyle.

During the second term of each year, lectures are delivered on the history of art, by Professor James L. Wood.

It is expected that students will accomplish the work of each class in one year. The year is divided into two terms of nearly equal length.

On entering the school, each student is placed immediately in the class for which he or she is best fitted, and advancement thereafter is regulated by the judgment of the instructors.

If at the end of three terms, a student has not progressed sufficiently to enter the Antique Class, or, if at the end of two terms, a student of the Antique Class is not prepared to enter the Life Class, he will be considered as lacking in either application or artistic ability, and may, at the discretion of the Faculty, be dropped from the class.

No definite time can be assigned for completing a course of training in art, but at the end of four years, or eight terms, a certificate is granted to students who have attended regularly and have done satisfactory work in the studies pursued. It should be understood, however, that any of the several lines of work in the Fourth Class may be carried as far as the successful achievement of the student warrants.

REQUIREMENTS FOR ADMISSION

First Class.—Applications must be approved by the Director.

Second Class.—A drawing from a plaster mask or fragment of a figure.

THIRD CLASS.—One or more drawings made from the cast and other objects.

FOURTH CLASS.—Applicants are required to submit specimens of work from the antique or life.

SPECIAL COURSES

Special students are admitted for the study of any of the subjects embraced in the above courses.

COURSE IN CLAY MODELING

This course is designed to give artistic training especially adapted to the needs of those desirous of devoting themselves to decorative sculpture in terra-cotta and stone as applied to buildings, and also to the needs of artisans and designers in silver, bronze, iron, and other forms of industrial products to which modeled ornament is applicable.

While in other respects the course of training is similar to that in the School of Drawing, Painting, and Modeling, a considerable portion of the student's time is devoted to designs practically available in industrial work.

COURSE IN WOOD-CARVING

A practical course in wood-carving and its applications to the various forms of industrial production.

The course embraces a study of the nature and use of tools, elementary exercises in carving, ornament of various kinds, original designs for panels, carved enrichments for furniture, frames, architectural decoration, etc.

For admission to this course, applicants should be proficient in free-hand drawing and elementary clay modeling.

Students who have not had this training divide their time between the classes in these branches and the work in carving.

Students have the privilege of attending the lectures on historic ornament and the architectural styles which are given at stated times during the year.

COURSE IN DESIGN AND DECORATION

This course is for the training of professional designers, and occupies three years. It provides thorough instruction in the principles of historic ornament and decorative design, and in the technical methods of their practical application to wall-paper, textiles, woodwork, metal-work, furniture, posters, book-covers, etc.

Full information concerning this course will be found on page 33.

COURSE IN ARCHITECTURAL DRAWING

A two-years' course in Free-hand Drawing, Ornament, the Orders of Architecture, Working Drawings, Perspective, Shades and Shadows, Sketching, Architectural Design, Measured Drawings, Planning of Buildings, Pen and Ink Rendering, Water-Color Rendering, Specifications and Contracts, with Lectures on the more important technical subjects connected with architectural work.

Full information concerning this course will be found on page 38.

The studios are open five days a week, from 9 a. m. to 4 p. m.

The accommodations of the Art Department are ample, the various rooms and studios being fitted with every requirement and convenience for the different kinds of work pursued.

All the work done by the students is subject to the control of the department until the close of the term or school year.

The Institute reserves the right to retain at least one specimen of work done by each student in each class.

SCHOLARSHIPS AND PRIZES

Mr. James W. Paul, Jr., President of the Board of Trustees, has established an annual scholarship in memory of his wife, to be known as The Frances Drexel Paul Scholarship. The scholarship is of the value of one hundred dollars, and carries with it free tuition in any of the courses in the Art Department. It is open to students who have spent at least one year in any course of this Department, and will be awarded at the concours held at the end of each academic year.

PHYSICAL TRAINING

Students enrolled in any of the Art courses have the privilege of attending the Institute classes in Physical Training twice a week, without additional charge. The training is carried on under the immediate supervision of Miss Hopkins and Mr. Ryder, the Directors.

MUSEUM AND ART COLLECTIONS

The department is supplied with an extensive collection of plaster casts, representative of the sculpture of the classic and Renaissance periods, and with valuable collections of drawings, designs, prints, and photographs. The collections of textiles, wood-carvings, metal-work, and ceramics in the Museum of the Institute are of great value in connection with the various lines of instruction. A collection of paintings bequeathed to the Institute by its founder, contains works by Meissonier, Bouguereau, Jules Stewart, Coignard, Dupray, Cesar de Cock, Boldini, Rico, Michetti, Madrazo, Jimenez, Ecüsquisa, Van Marcke, Gieryinski, Ridgway Knight, Richards, Hamilton, etc., etc.

LIBRARY

In the Library of the Institute, which contains twenty-four thousand volumes, there is an extensive collection of valuable art and illustrated books to which the students have free access.

The Reading-room is supplied with the leading art periodicals.

FEES AND TERMS

SCHOOL OF ILLUSTRATION

Draped and Costumed Model and Critical Lectures, *twenty dollars* per term.

Illustration and Critical Lectures, *twenty dollars* per term.

Costumed Model, Illustration, and Critical Lectures, *twenty-five dollars* per term.

Critical Lectures, *ten dollars* per term.

Critical Lectures for members of the School of Drawing, Painting, and Modeling, *five dollars* per term.

SCHOOL OF DRAWING, PAINTING, AND MODELING

First class, *twelve dollars* per term; second class, *twelve dollars* per term; third and fourth classes, *fifteen dollars* per term, each.

SPECIAL STUDENTS

In Water-Color, Oil Painting, Still-life, Drawing or Painting from Life, or Clay Modeling, *fifteen dollars* per term.

COURSE IN CLAY MODELING

Fifteen dollars per term.

COURSE IN WOOD-CARVING

Wood-Carving only, *fifteen dollars* per term. Wood-Carving with Drawing and Clay Modeling, *twenty dollars* per term.

There are two terms in the year, beginning in September and February, respectively.

Each student is charged *fifty cents* per term for the use of a coat-locker, with individual combination lock, which gives him the absolute control of his own property.

A deposit of *fifty cents* is required of each student, as security for the return of the locker key. A deposit of *fifty cents* additional, as security for the return of the key of the locker in the gymnasium, is required of each student taking physical training.

A storage-room for bicycles, in the basement, is provided by the Institute, free of charge. An individual check for each bicycle is given by the attendant.

EVENING CLASSES

The Evening Classes extend through six months of the year, from October to March, inclusive.

Instruction is given in the following subjects: Free-hand Drawing from the Cast, Drawing from the Antique, Life, Modeling in Clay, Architectural Drawing, Building Construction, Design, Pen and Ink Rendering, Water-Color Rendering, Wood-Carving.

Full details of these classes will be found on page 158.

COURSE IN DESIGN AND DECORATION

INSTRUCTORS

ALICE J. MORSE, Design and Decoration.
ARTHUR TRUSCOTT, Artistic Lettering.
PRESCOTT A. HOPKINS, M. S., Architectural Styles.
JAMES L. WOOD, Drawing from the Antique and Artistic Anatomy.
JOHN J. DULL, Water-Color Rendering.
ELIZABETH L. BLOOMFIELD, Drawing.
JAMES L. WOOD, Lecturer on The History of Art.
MAUDE G. HOPKINS,
J. PETERSON RYDER, S. B., } Directors of Physical Training.

The Course in Design and Decoration is intended for the training of professional designers, and occupies three years. It provides thorough instruction in the principles of historic ornament and decorative design, and in the technical methods of their practical application to wall-paper, textiles, woodwork, metal-work, furniture, ceramics, book-covers, etc.

COURSE OF INSTRUCTION

JUNIOR YEAR

FIRST TERM

Study of drawing and color, from objects in the Museum, with special reference to the later work in actual design; geometric composition and the theory of design; problems in prehistoric, Egyptian, Assyrian, Greek, Roman, and Pompeian ornament.

SECOND TERM

Problems in Byzantine, Romanesque, Saracenic, Gothic, Persian, and Indian ornament; artistic lettering; lectures on the history of art.

Illustrated lectures on the architectural styles are given throughout the year.

MIDDLE YEAR

FIRST TERM

Problems in Renaissance ornament (Italian, French, German, and Spanish); Tudor and Elizabethan ornament; the styles of the Louis and the Empire; studies from nature in water-color; principles of conventionalization.

SECOND TERM

Designs for stencils, textiles (woven and printed), furniture, wrought-iron, brass, silver, pottery, china, book-covers, wall-papers, stained glass, mosaic, leather, etc.; studies from nature in water-color; principles of conventionalization; lectures on the history of art.

SENIOR YEAR

FIRST TERM

The work of this term is largely a continuation of that of the previous term, with the addition of the study of interior decoration as a whole; studies from nature; methods of the Japanese in design; posters.

SECOND TERM

Applied design—the making of designs which are salable and capable of reproduction and manufacture; lectures on the history of art.

During this term, attention is given to rendering, as well as to the purely artistic side of the work.

Students may elect to spend a portion of this year in drawing from life and in the study of artistic anatomy.

Through the entire course the students make as many drawings and color-studies as possible, as an aid in working out the problems and as a means of cultivating their artistic and decorative sense.

PHYSICAL TRAINING

Students have the privilege of attending the classes in Physical Training throughout the three years of the course, without additional charge.

DIPLOMA

A diploma is awarded to students who complete the course and pass all the required examinations.

SPECIAL COURSES

For those unable to devote the time required for the full course, Special Courses in Applied Design will be arranged in accordance with individual needs, provided such applicants have had previous experience in work of this kind, or are fitted to profit by the instruction.

ATTENDANCE

Students taking the regular course attend from 9 a. m. until 4 p. m., from Monday to Friday, inclusive.

MUSEUM AND ART COLLECTIONS

Students have the advantage of carrying on their work in immediate connection with the Museum, which contains an extensive collection of plaster casts, representative of the sculpture of the classic and Renaissance periods, and valuable collections of drawings, designs, prints, and photographs. The decorative arts of Egypt, India, China, Japan, and Europe are well represented. The collections of European textiles, dating from the fourteenth century, and of India printed cloths are worthy of special mention. A collection of paintings bequeathed to the Institute by its founder, contains works by Meissonier, Bouguereau, Jules Stewart, Coignard, Dupray, Cesar de Cock, Boldini, Rico, Michetti, Madrazo, Jimenez, Ecüsquisa, Van Marcke, Gieryinski, Ridgway Knight, Richards, Hamilton, etc., etc.

LIBRARY

The Library is supplied with an extensive collection of books in fine and applied art, embracing many important and valuable works on design and decoration. The best periodicals relating to these subjects are supplied in the Reading-room.

ADMISSION

For admission, applicants who have studied in the Art Department must at least have completed the work of the First Class in the School of Drawing, Painting, and Modeling, or its equivalent. All other applicants must submit drawings of sufficient merit to warrant their admission to the course. Some experience in the use of water-color is of advantage to a student entering the class. A good elementary English education is a necessity. Students under seventeen years of age are advised not to undertake the work.

FEES AND TERMS

Fifteen dollars per term.

A deposit of *fifty cents* is required of each student, as security for the return of the locker key. A deposit of *fifty cents* additional, as security for the return of the key of the locker in the gymnasium, is required of each student taking physical training.

There are two terms in the year, beginning in September and February, respectively.

COURSES IN ARCHITECTURAL DRAWING

FACULTY AND INSTRUCTORS

JAMES MAC ALISTER, LL. D., President of the Institute.

ARTHUR TRUSCOTT,
Professor of Architecture.
PRESCOTT A. HOPKINS, M. S.,
Assistant Professor of Architecture.
————————————,
Professor of Mechanical Drawing and Lecturer on Steam-Heating.
CHARLES H. WHEELER, Ph. B.,
Professor of Mathematics.
JOHN J. DULL,
Professor of Architectural Design and Water-Color Rendering.
HOWARD S. RICHARDS, B. S.,
Professor of Building Construction.
HERMAN L. DUHRING,
Instructor in Architectural Drawing.
HARRIET L. MASON,
Chief Instructor in English.
ELIZABETH L. BLOOMFIELD,
Instructor in Drawing from the Cast.
ANNIE P. SHEDDEN,
Instructor in General History.
JAMES L. WOOD,
Lecturer on The History of Art.
ARTHUR J. ROWLAND,
Lecturer on Electrical Lighting.
JOHN T. HOLDSWORTH,
Lecturer on Business Customs.
R. WILLETTE CLINGER,
Instructor in Wood-Turning.
J. PETERSON RYDER, S. B.,
Director of Physical Training.

The course of study in Architectural Drawing aims to give students such general training in drawing, design, decoration, and building construction as will enable them to become successful architectural draftsmen. This general artistic training is supplemented by the study of mathematics, general history, and English. The course, in fact, is extensive and thorough enough to equip students for professional work on their own account, after the necessary drill and experience which can only be obtained in an architect's office. While practical training is strongly emphasized, stress is laid upon the artistic work of the students, and special attention is given to rendering in pen, pencil, and brush. The lectures on the history of architecture furnish a comprehensive knowledge of the development and growth of the various styles.

The course occupies two years, a large share of the time being devoted to purely architectural work.

COURSE OF INSTRUCTION

JUNIOR YEAR

FIRST TERM

STUDY OF THE ORDERS OF ARCHITECTURE from Vignole and actual examples.

PERSPECTIVE.—Theoretical principles.

SHADES AND SHADOWS.

SKETCHING from photographs, casts, and buildings, in pencil.

HISTORIC ORNAMENT.—Greek, Roman, Byzantine, in line and color.

BUILDING MATERIALS.—Kinds and qualities of materials used for building purposes.

Mathematics.—Review of Arithmetic: decimals, ratio, proportion, percentage, square root; the metric system. Algebra: through simple fractions and the solution of some simple equations.

English.—Principles of composition and exercises in writing.

General History.—Ancient.

Second Term

Study of the Orders of Architecture, continued.

Perspective.—Practical exercises.

Sketching, continued.

Historic Ornament.—Romanesque, Moresque, Gothic, Renaissance, in line and color.

Building Construction.—Working drawings and principles of heating, ventilation, and plumbing.

Graphical Statics.—Essential elements for practical work.

Mathematics.—Algebra: continued to quadratic equations. Plane geometry: the straight line.

English.—Principles of composition and exercises in writing.

General History.—Medieval, modern.

Building Laws.—The more important statutes on the subject.

Illustrated lectures on the history of architecture throughout the year.

Physical Training in the Gymnasium, twice a week, throughout the year.

SENIOR YEAR

First Term

Architectural Design.

Planning of Domestic and Business Buildings.

ARCHITECTURAL ORNAMENT AND DECORATION.

MEASURED DRAWINGS from actual measurements of buildings.

CONSTRUCTIVE DESIGN, APPLIED STATICS, STRENGTH OF MATERIALS, with laboratory work.

SKETCHING in pencil and wash.

PEN AND INK RENDERING.

WATER-COLOR RENDERING.—Actual buildings and original designs.

MATHEMATICS. —Quadratic equations, plane geometry.

WOOD-TURNING.—Designing and shopwork.

SECOND TERM

ARCHITECTURAL DESIGN.

ARCHITECTURAL ORNAMENT AND DECORATION, continued.

SKETCHING, continued.

MEASURED DRAWINGS, continued.

WATER-COLOR RENDERING, continued.

PEN AND INK RENDERING.—Reproductive work and original designs.

STEREOTOMY.

PLANNING OF BUILDINGS.—Theses.

MATHEMATICS.—Plane geometry completed, solid geometry.

SPECIFICATIONS. CONTRACTS. ESTIMATES.

LECTURES ON ELECTRICAL LIGHTING.

LECTURES ON HEATING, VENTILATION, AND PLUMBING.

BUSINESS FORMS AND CUSTOMS.

Illustrated lectures on the history of architecture throughout the year.

PHYSICAL TRAINING in the Gymnasium, twice a week, throughout the year.

Students attend five days a week, from 9 a. m. to 4 p. m., with an hour's recess in the middle of the day.

The appliances of the department include a 200,000-pound testing machine, built by Tinius Olsen, which is arranged for tensile, compressive, and transverse tests, and for the testing of cement, etc.

Visits are made by the students, accompanied by the professors, from time to time, to the more important buildings of the city and neighborhood.

DIPLOMA

A diploma is granted to students who complete the course and pass all the required examinations.

GRADUATE COURSE

For students desirous of devoting more time to preparation for actual work, a Graduate Course of one year is provided. This course embraces advanced work in architectural design, constructive design, architectural sketching, architectural history, plumbing and sanitation, mathematics, general history.

GYMNASIUM

The Gymnasium is a large, airy room completely equipped in accordance with the requirements of the Swedish system of physical training and with dressing-rooms, and bathrooms supplied with hot and cold water. All the training is conducted under the immediate supervision of the Director.

LIBRARY AND MUSEUM

In the Library there is an extensive collection of valuable and important works on architecture, and the leading periodicals relating to the subject are supplied in the Reading-room.

The collections in the Museum afford ample opportunity for the study of the industrial arts allied to architecture. The decorative arts of Egypt, India, China, Japan, and Europe are well represented.

ADMISSION

Applicants must have at least a good elementary education. The examination for admission includes English grammar and composition, arithmetic, and proficiency in mechanical and free-hand drawing. The necessary preparatory training in drawing can be obtained in the Art Department of the Institute. Entrance examinations are held in June and September.

FEES AND TERMS

Fee, *thirty dollars* per term.

Students provide their own drawing instruments, text-books, and stationery.

Coat-lockers, with individual combination locks, giving students the absolute control of their own property, are supplied in the main building at a rental of *fifty cents* per term for each student.

There are two terms in the year, beginning in September and February, respectively.

EVENING CLASSES.

In the Evening Classes, systematic instruction is given in Architectural Drawing and Design, Pen and Ink Rendering, Water-color Rendering, Building Construction, and House Construction.

The session extends through six months, from the beginning of October to the end of March.

FEES.—From *three dollars* to *six dollars*, according to the course taken, for the entire session of six months.

Full details of these courses will be found from page 159 to page 165, inclusive.

DEPARTMENT OF MECHANIC ARTS

FACULTY AND INSTRUCTORS

JAMES MAC ALISTER, LL. D., President of the Institute.

LIEUT. WILLIAM L. BAILIE (Engineer Corps, U. S. Navy), Director, and Instructor in the Theory and Practice of the Steam-Engine.

ERNEST A. CONGDON, Ph. B., Professor of Chemistry.

WILLIAM J. HOPKINS, S. B., Professor of Physics.

——————————, Professor of Mechanical Drawing.

CHARLES H. WHEELER, Ph. B., Professor of Mathematics.

ALBERT P. BRUBAKER, M. D., Professor of Physiology and Hygiene.

PRESCOTT A. HOPKINS, M. S., Lecturer on Architectural Styles.

HARRIET L. MASON, Chief Instructor in English.

ANNIE P. SHEDDEN, Instructor in History.

ALICE M. BRENNAN, Instructor in English.

KATHARINE F. DILL, B. S., Instructor in Mathematics.

J. PETERSON RYDER, S. B., Director of Physical Training.

THOMAS SMITH, B. S., M. E., Instructor in Mechanical Drawing.

ABRAHAM HENWOOD, Instructor in Chemistry.

JOHN T. HOLDSWORTH, Associate Professor of American History and Civics.

OSCAR C. SCHMIDT, Instructor in Mechanical Drawing.

STUART J. MOLONY, Assistant in Physical Laboratory.

WILLIAM B. CREAGMILE, Assistant in Electrical Laboratories.

CLEMENT E. MOSSOP, Instructor in Bench-Work and Machine-Work.

R. WILLETTE CLINGER, Instructor in Woodwork.

THOMAS MCCREIGHT, Instructor in Forging.

The Department of Mechanic Arts provides a thorough course of instruction and training in mathematics, science, drawing, and shop-work, in connection with the essential English branches of a secondary education.

While the education given is intended to prepare for business or industrial pursuits, it seeks to develop and cultivate those qualities of mind and character that are of most value in the conduct of life. The object at every stage is to give the student the power to think and act for himself—the practical ability that is the best result of school training.

The whole course of instruction is so broad and yet so practical that the graduate cannot fail to find some occupation for which his taste and aptitude fit him; and at the same time he will be prepared for such an advanced scientific or technical course as he may desire to pursue.

The Department of Mechanic Arts prepares students for admission to the technical courses in Electrical Engineering and Machine Construction and to the course in Architecture, in the Institute.

COURSE OF INSTRUCTION

JUNIOR YEAR

FIRST TERM

LANGUAGE.—Common figures of speech, punctuation, letter-writing. Reading of American classics.

MATHEMATICS.—Review of Arithmetic; the metric system of weights and measures. Algebra: through simple fractions, including the solution of some simple equations of the first degree.

DRAWING.—Mechanical, free-hand.

General History.—Ancient history.

Shop-Work.—Woodwork: joinery. Ironwork: chipping and filing.

Second Term

Language.—Composition. Biographical studies of American classics.

Mathematics.—Algebra: continued to quadratic equations. Plane geometry: the straight line.

Drawing.—Mechanical, free-hand.

General History.—Medieval and modern European history.

Shop-Work.—Woodwork: joinery. Ironwork: chipping and filing.

Physical Training in the Gymnasium, twice a week, throughout the year.

MIDDLE YEAR

First Term

Language.—Sentences, diction, composition. Selected plays of Shakespeare.

Mathematics.—Algebra: quadratic equations, imaginaries, proportion, progressions, variations, use of logarithms. Plane geometry: the circle, similar figures.

Drawing.—Mechanical, free-hand. Descriptive geometry.

Science.—General chemistry—lectures, recitations, and laboratory work.

American History and Civics.

Shop-Work.—Woodwork: turning. Pattern-making begun. Ironwork: forging begun.

Second Term

Language.—Grammatical principles, composition. English classics.

MATHEMATICS.—Plane geometry completed. Solid geometry.

DRAWING.—Mechanical, free-hand. Descriptive geometry.

SCIENCE.—General chemistry—lectures, recitations, and laboratory work.

AMERICAN HISTORY AND CIVICS.

SHOP-WORK.—Woodwork: pattern-making finished. Metal-work: forging, molding, and founding.

PHYSICAL TRAINING in the Gymnasium, twice a week, throughout the year.

SENIOR YEAR

FIRST TERM

LANGUAGE.—Rhetorical principles, structure of the English language, essay-writing. English classics.

MATHEMATICS.—Algebra: binomial theorem, permutations, theorem of indeterminate coefficients, partial fractions, vanishing fractions. Plane trigonometry, including the solution of right and oblique triangles.

DRAWING.—Mechanical, architectural. Descriptive geometry. Lectures on the architectural styles.

SCIENCE.—Outlines of general physics—lectures, recitations, and laboratory work.

THEORY AND PRACTICE OF THE STEAM-ENGINE.

SHOP-WORK.—Machine-work.

WOOD-CARVING.—Exercises.

SECOND TERM

LANGUAGE.—Essay-writing. Historical outlines of English and American literature. English classics.

MATHEMATICS.—Algebra and trigonometry continued. Plane surveying with field work.

Drawing.—Mechanical. Descriptive geometry. Architectural styles.

Science.—Outlines of general physics—lectures, recitations.

Applied Electricity.—The phenomena and simpler laws of electrostatics, magnetism, current electricity. The application of electrostatic and magnetic phenomena to useful purposes. Methods of current distribution and descriptions of their application to lighting, power, etc. Electrical laboratory work.

Theory and Practice of the Steam-Engine.

Human Physiology and Hygiene.—Lectures.

Shop-Work.—Machine-work.

Wood-Carving.—Applied work.

Public Speaking, once a week, throughout the year.

Students attend five days a week, from 9 a. m. to 4 p. m. The time of the student is about equally divided between the classroom and laboratory studies and the shop-work.

The scientific instruction is given chiefly by lectures and laboratory work, the text-book being used only for reference and review.

The English instruction, which is carried throughout the entire course, is thorough and comprehensive and furnishes a basis of sound liberal culture for all the other studies.

The practical instruction given in the shops affords a valuable aid to the scientific studies. It brings the student into direct and intimate relation with natural forces, where a practical application of these studies is required. While no attempt is made to teach the student a trade, yet a good knowledge is imparted of the technical apparatus involved in the mechanic arts, this knowledge being indispensable in the work of the mechanical or electrical engineer, in order that his designs may be practicable and of economical construction.

The Institute reserves the right to retain drawings and products of the workshops made by students.

Visits are made by the students, accompanied by the professors, from time to time, to the chief industrial establishments of the city and neighborhood.

DIPLOMA

A diploma is granted to students who complete the course and pass all the required examinations.

SPECIAL COURSES

Special courses can be arranged to suit the individual needs of students who are fitted to pursue them advantageously.

LABORATORIES AND WORKSHOPS

The chemical and physical laboratories are large, well-lighted, well-ventilated rooms, and are supplied with extensive collections of apparatus and with every appliance for the work done by the students.

The technical shops for woodwork, bench-work, machine-work, and forging are unsurpassed in the completeness and perfection of their appointments. A Corliss engine, which is placed in the machine-shops, supplies the power to all the shops and is used also for the instruction in steam engineering.

There are two electrical laboratories, beside smaller rooms devoted to electrical work. The larger laboratory is a finely-appointed room and is provided with a forty-horse-power Porter-Allen engine, a forty-horse-power Armington-Sims marine engine, dynamos of the most recent design, storage batteries, and all the necessary apparatus and appliances for practical instruction in electrical science and its applications. The smaller laboratories are situated in the Annex and are well equipped with apparatus and conveniences for the study of theoretical electricity.

The extensive mechanical and electrical plant of the Institute building is also made available in the technical instruction.

GYMNASIUM

The Gymnasium is a large, airy room, completely equipped in accordance with the requirements of the Swedish system of physical training and with dressing-rooms, and bath-rooms supplied with hot and cold water. All the training is conducted under the immediate supervision of the Director.

LIBRARY AND MUSEUM

In connection with the work of the Department, constant use is made of the Library, which contains twenty-four thousand volumes, and of the Museum of the Institute. The students have also the use of the Reading-room which is well supplied with the best home and foreign periodicals relating to art, science, technology, and literature.

ADMISSION

Students must have at least a good elementary education. The examination for admission includes English grammar and composition, arithmetic, geography, United States history. Advanced standing can be taken by students possessing the requisite qualifications. Entrance examinations are held at the beginning of June and September.

Application for admission should be made to the Registrar, at the Institute, between 9 a. m. and 4 p. m., or by letter.

FEES AND TERMS

First term of each year, *thirty-eight dollars;* second term, *thirty-seven dollars.*

Each student is charged *fifty cents* per term for the use of a coat-locker, with individual combination lock, which gives him the absolute control of his own property.

The fees include all materials and tools used in the chemical, physical, and electrical laboratories and the workshops. Students are responsible, however, for their own breakage in the laboratories and workshops. A deposit of *fifty cents* is required the first year, as security for the return of the locker key. A deposit of *five dollars* is required at the beginning of the second and the third year, which is returned at the close of the year, less the cost of the apparatus destroyed.

The training in the gymnasium, use of baths, etc., is included in the fee.

Students supply their own text-books and drawing instruments.

There are two terms in the year, beginning in September and February, respectively.

COURSE IN ELECTRICAL ENGINEERING

FACULTY AND INSTRUCTORS

JAMES MAC ALISTER, LL. D., President of the Institute.

ARTHUR J. ROWLAND,
Professor of Electrical Engineering.

____________________,
Professor of Mechanical Engineering.

ERNEST A. CONGDON, Ph. B.,
Professor of Chemistry.

WILLIAM J. HOPKINS, S. B.,
Professor of Physics.

CHARLES H. WHEELER, Ph. B.,
Professor of Mathematics.

HARRIET L. MASON,
Chief Instructor in English Language and Literature.

ABRAHAM HENWOOD,
Instructor in Chemistry.

THOMAS SMITH, B. S., M. E.,
Instructor in Mechanical Drawing.

OSCAR C. SCHMIDT,
Instructor in Mechanical Drawing.

WILLIAM B. CREAGMILE,
Assistant in Electrical Laboratories.

PRESCOTT A. HOPKINS, M. S.,
Lecturer on Building Construction.

PARKE SCHOCH, A. M.,
Lecturer on Business Forms.

The Course in Electrical Engineering offers unusual facilities for instruction in this important department of science and technical training. The growing importance of the subject and the constantly increasing number of its applications are opening up new opportunities for young men in various lines of work. The course is designed to make the instruction both thoroughly scientific and practical. For this purpose, the laboratories have been equipped with the newest forms of apparatus and every appliance necessary for efficient training. By a judicious allotment of time, and with the scientific and technical training given in the Mechanic Arts Course as a basis, a thorough technical training in each subject is given the students in the two years required for this course. No attempt is made to teach pure science except in connection with its application to engineering; the particular object in view being to fit students creditably to occupy useful and important positions in which immediate and practical use can be made of their knowledge of engineering.

To this end, practice and theory are constantly brought into direct relation with each other. The student is made familiar with the construction and operation of the several parts of the steam-engine, dynamos, motors, and with the various types of steam and electrical generators; he is taught the theory of their operation so that he can intelligently manage them and locate and repair any defect or derangement of the apparatus.

The scope of the course is also broadened by courses of lectures on telephone systems, by Professor William J. Hopkins, and on building construction, by Professor Prescott A. Hopkins. During the Senior Year, a short course of lectures is given on business forms and customs.

These lectures are intended to introduce the students to a knowledge of such business affairs as they may be expected to deal with in whatever position they may be called upon to fill in after life.

Use is made of the ample opportunities afforded in Philadelphia for inspecting power and lighting plants, manufacturing establishments, and many places where important engineering processes are carried on. Occasional tests are also made of plants belonging to large establishments in the city.

Students desiring to specialize on the mechanical side of the course, devote a large portion of time to the subjects belonging thereto, during the Senior Year.

COURSE OF INSTRUCTION

The course of instruction and training occupies two years and includes the following subjects :—

JUNIOR YEAR

FIRST TERM

MATHEMATICS.—Analytical geometry.

PHYSICS.—Gases, heat—lectures and laboratory work.

CHEMISTRY.—Qualitative analysis.

THEORETICAL ELECTRICITY.

ELECTRICAL LABORATORY WORK.

MECHANICS OF MACHINERY.

MACHINE-SHOP PRACTICE.

ENGLISH LANGUAGE.

SECOND TERM

MATHEMATICS.—Calculus.

PHYSICS.—Light, sound—lectures and laboratory work.

CHEMISTRY.—Qualitative analysis.

THEORETICAL ELECTRICITY.

ELECTRICAL LIGHTING AND PHOTOMETRY.

ELECTRICAL LABORATORY WORK.

VALVE-GEARS.

BOILERS.

MECHANICAL LABORATORY WORK.

SENIOR YEAR

FIRST TERM

MATHEMATICS.—Calculus.

ALTERNATING CURRENTS.

ELECTROMAGNETS.—Dynamos and motors.

ELECTRICAL LABORATORY WORK.

CHEMISTRY.—Technical chemistry.

THERMODYNAMICS.—Steam, gas, air.

STRENGTH OF MATERIALS.

MECHANICAL LABORATORY WORK.

PAPERS ON ELECTRICAL SUBJECTS.

SECOND TERM

ALTERNATING CURRENTS.

ELECTROMAGNETS.—Dynamos and motors.

ELECTRICAL ENGINEERING.

TELEGRAPHS AND SIGNAL SYSTEMS.

ELECTRICAL LABORATORY WORK.

TELEPHONES.

HYDRAULICS AND TURBINES.

THE STEAM-ENGINE—ITS STRUCTURE AND DESIGN.

MECHANICAL LABORATORY WORK.

PAPERS ON ELECTRICAL SUBJECTS.

LECTURES ON ELECTRICAL MEASURING INSTRUMENTS AND THEIR USE.

LECTURES ON BUILDING CONSTRUCTION.

LECTURES ON BUSINESS FORMS AND CUSTOMS.

The following table gives the distribution of time for the several subjects of instruction:—

JUNIOR YEAR

SUBJECT	No. of hours per week.	
	1st Term.	2d Term.
Analytical Geometry	4	—
Calculus	—	4
Physics—gases, heat, light, sound	2	2
Physical Laboratory Work	4	4
Chemistry—Qualitative Analysis and Laboratory Work	4	4
Theoretical Electricity	5	5–4 (a)
Electric Lighting and Photometry	—	1 (b)
Electrical Laboratory Work	8	8
Mechanics of Machinery	2	—
Valve Gears	—	2
Boilers	—	2
Machine-shop Practice	2	—
Mechanical Laboratory Work	—	2
English Language	2	—
Total	33	33

(a) Half term each. (b) Half term.

SENIOR YEAR

Subject	No. of hours per week.	
	1st Term.	2d Term.
Calculus	4	—
Alternating Currents	2	3
Electromagnets—dynamos and motors	3	2(b)
Electrical Engineering	—	1(b)
Electrical Measuring Instruments (lecture)	—	1
Telegraphs and Signal Systems	—	1(b)
Telephones	—	1
Papers on Electrical Subjects	1	1
Electrical Laboratory Work	8	14
Thermodynamics	2	—
Strength of Materials	2	—
Hydraulics and Turbines	—	2
Steam Engine	—	2
Mechanical Laboratory Work	7	4
Technical Chemistry	4	—
Lectures on Electrical Measuring Instruments	—	1
Lectures on Building Construction	—	1
Lectures on Business Forms	—	1
Total	33	33

(b) Half term.

DIPLOMA

A diploma is given to students who complete the full course of instruction and pass all the required examinations.

ELECTIVE PREPARATORY COURSES.

For students who are not prepared to enter the regular course, Special Courses in Mathematics, Mechanical Drawing, Science, and Shop-work can be arranged, leading to the course in Electrical Engineering.

No part of the special courses is to be undertaken in connection with the regular two years' course. They are arranged simply for the convenience of students who come to the Institute not fully prepared to enter upon the engineering work.

LABORATORY WORK

The laboratory work runs parallel with the lectures and instruction and is carried through both years. The principal lines of the experimental work are as follows:—

ELECTRICAL.—Use of all the usual instruments and their calibration; measurements of current, potential, resistance, capacity; battery tests; arranging and wiring the various sorts of circuits; setting up and starting dynamos and motors, with complete tests of the same; locating trouble in machines, instruments, and wires, and making repairs; photometer work; efficiency of arc and incandescent lamps; insulation tests of various kinds; permeability tests of iron and steel; silver and copper electrolysis for exact current measurement; measurement of self and mutual inductance; alternating current measurements of various kinds including dynamo and transformer tests.

These experiments are such as will be of practical use in engineering tests. Original research is limited to such subjects as have bearing on general engineering practice.

MECHANICAL.—Shaft aligning; valve-setting; use of steam-engine indicator, of calorimeter in determining moisture in steam, of Prony brake in engine tests; calibration of steam and water gages; boiler tests for radiation and evaporation; engine tests for efficiency; comparison of lubricants; tests of strength of materials.

This work is arranged to familiarize the student with the practical duties of the engineer. Instruction is given in the construction and repair of the various apparatus; the use and operation of the testing machine for the strength of materials; and the apparatus for testing the efficiency of lubricants. The work of the mechanical and electrical laboratories is combined to make complete transmission tests from the combustion of the coal in the furnace to the desired resultant of heat, light, electrical or mechanical power.

LABORATORIES

The principal laboratory is equipped with a complete outfit of modern electrical machinery and testing apparatus. There are dynamos of all the varieties in use, representing among them most of the types of modern construction,—a 30 K. W. 500-volt compound-wound dynamo; a T. H. arc dynamo; a 250 ampere plating dynamo; several 110-volt dynamos; a 1000-volt alternator; a two-phase alternating current generator. There are motors adapted for all the circuits which would be supplied from dynamos of these different kinds and sizes, including a pair of street-car motors arranged so that complete tests of them may be made. Alternating current transformers of many types and sizes, a large set of sixty cells of storage batteries, plating baths, arc and incandescent lights, resistances, banks of lamps, etc., make up some of the general equipment. Among the instruments may be named ammeters, voltmeters, wattmeters, speed counters, stop watches, and all appliances for dynamo, motor, and transformer testing, electro-deposition, etc. All circuit connections are made through a system of switchboards, which renders it possible to have any current at any part of the laboratory. In another laboratory, in a separate building but connected with the dynamo-room by a number of independent circuits, are placed galvanometers, Wheatstone bridges, condensers, standards of electromotive force, resistance and inductance, voltameters, photometers, and many delicate and expensive appliances for accurate measurements, calibration of instruments, etc. Located as these instruments are, all effects due to the proximity of large magnetic masses of iron and to the vibration of machinery in motion are obviated.

The motive power for the dynamo laboratory is supplied by a seventy-five-horse-power Porter-Allen engine which drives a counter-shaft, and by a twenty-horse-power Armington & Sims double vertical engine which, with a 110-volt multipolar dynamo, forms an excellent example of direct-connected machines.

The engines and boilers used for lighting the building, the engines in the dynamo laboratory, and the Corliss engine in the machine shop furnish excellent opportunities for comparative and original work. The machine shop, in which the construction of approved designs by the students is carried out by them, is equipped with tools by the best makers and is unsurpassed in its appointments. Conspicuous among the gages, thermometers, indicators, and other instruments usually found in mechanical laboratories, is a 200,000-pound testing machine, built by Tinius Olsen, which is arranged for tensile, compressive, and transverse tests.

The laboratory plant is used only for laboratory work, and is put under the direct charge of the students, thus giving them experience in handling a complete electrical plant and training in dealing with emergencies. It has no connection with the power or lighting plant of the Institute. Constant reference is made, however, to the extensive mechanical and electrical plants in the Institute building.

The chemical laboratories for qualitative analysis and technical chemistry are separate, and each has special facilities for the work undertaken. Every appointment which contributes to the comfort and convenience of the student is provided.

LIBRARY AND READING-ROOM

The Library of the Institute, which contains twenty-four thousand volumes, is well supplied with works on the various subjects included in the course. Additions are constantly made of new books as they appear.

The Reading-room is supplied with the best home and foreign periodicals of art, science, technology, and literature, including the leading journals relating to electricity and allied subjects.

Duplicates of the leading technical journals are kept in the Reading-room of the Engineering Department, for ready reference by the students.

ADMISSION

For admission, students must have finished the course in Mechanic Arts. Applicants who have not taken that course must pass an examination in the mathematics, physics, chemistry, mechanical drawing, and English included in the same. A certain amount of training in shop-work is also a necessity.

Application for admission should be made to the Registrar, at the Institute, between 9 a. m. and 4 p. m., or by letter.

FEES AND TERMS

Regular Course.—First term of each year, *thirty-eight dollars;* second term, *thirty-seven dollars.*

A deposit of *ten dollars* is required of every student, at the beginning of each year, to insure the Institute against loss through injury to the apparatus in the laboratories. This is returned at the close of the year, less the cost of the apparatus injured or destroyed. All the apparatus and materials used in the laboratories are supplied by the Institute.

Each student is charged *fifty cents* per term for the use of a coat-locker, with individual combination lock, which gives him the absolute control of his own property.

The students supply their own text-books and stationery.

SUBJECTS OF INSTRUCTION

MATHEMATICS

The study of mathematics is carried through the Junior, and the first term of the Senior Year, beginning with a review of algebra and trigonometry, followed by a course in the elements of analytical geometry. The second term of the Junior and the first term of the Senior year are given to the elements of the differential and integral calculus, embracing its application to a large class of practical problems. The object is to give the student such facility in the use of mathematics as to make it a valuable instrument in his engineering work.

PHYSICS

This course consists of two lectures and two laboratory periods a week throughout the Junior Year.

The subjects of gases, heat, light, and sound are given specialized and advanced treatment, both in the lectures and in the laboratory. The experimental work is of a high grade of accuracy, and the student becomes familiar by practice with the most delicate and precise instruments and methods of research

CHEMISTRY

The work in Chemistry, which is specially adapted to the needs of the practical engineer, occupies three terms, both terms of the Junior Year being devoted to qualitative analysis, and one term of the Senior Year to technical chemistry.

QUALITATIVE ANALYSIS.—Lectures and laboratory work, with frequent oral, and occasional written, examinations. One lecture and one laboratory period per week.

The student first studies the reaction of the commoner metals. After this preliminary work, he analyzes solutions containing the metals, beginning with solutions of the separate groups of metals, afterwards analyzing solutions containing all the metals studied.

In like manner, the acids are next studied and a set of solutions analyzed. The student then proceeds to analyze solutions that contain all of the bases and acids studied; after which, general miscellaneous qualitative work is taken up, such as the examination of powders, insoluble substances, alloys, and such special work as time permits.

TECHNICAL CHEMISTRY.—One lecture and one laboratory period per week, during the first term of the Senior Year.

Fuel.—Proximate analysis of coal; moisture, volatile matter, coke, ash, and sulphur. Specific gravity and calorific value.

Gas.—Determinations of carbon di-oxide, oxygen, carbon monoxide, hydrogen and nitrogen, employing the Elliot, Fisher-Orsat, and Hempel forms of apparatus.

Water.—Total solid matter, temporary and permanent hardness, chlorides, sulphates, nitrates, also silica, iron oxide, alumina, lime, magnesia, potash, and soda.

Lubricating Oil.—Specific gravity, viscosity, cold test, flashing point, loss in weight on exposure to elevated temperatures, tendency to oxidize and gum, percentage of mineral and of fatty oil, free fatty acid, free mineral acid, suspended matters, rosin oil.

ELECTRICAL SUBJECTS

THEORETICAL ELECTRICITY.—The course includes treatment of such subjects as electrostatic induction, magnetic induction, electrolysis and the theory of primary and secondary batteries, electromagnetic induction. Electrical units. Theory of continuous current, dynamos, and motors.

ELECTROMAGNETS, DYNAMOS, AND MOTORS.—The principles of the magnetic circuit and their application in magnet design. Practical applications for magnets and specific designs. Dynamo and motor design.

ALTERNATING CURRENTS.—The theory of periodic currents; the application of such currents to both single and polyphase alternating current systems of generation and distribution. The designing of distributing systems. The planning of transformers, alternators, and alternating current motors.

ELECTRIC LIGHTING AND PHOTOMETRY.—How to choose lights and place them. How much light to provide. Standards of light and their use in making measurements. The usual methods of lighting. Comparison of electric lighting with other methods. Cost of lighting.

TELEGRAPHS AND SIGNAL SYSTEMS.—Explanations are given of the following: Morse, duplex, quadruplex, Marconi, district messenger, fire alarm, annunciator, and railway block signal systems.

TELEPHONES AND TELEPHONE SYSTEMS.—The history and theory of the development of transmitters and receivers; switchboards; cables and lines; line construction. Disturbances and the methods of correction.

ELECTRICAL ENGINEERING.—Transmission and distribution of energy; storage battery applications; electric railways and traction problems; station management; estimates; specifications.

ELECTRICAL MEASURING INSTRUMENTS AND THEIR USE.—Lectures on methods of construction, of calibration, of repair, of instruments used in electrical measurements. Methods of testing dynamo machinery, distributing circuits for telegraph, telephone, light and power service, and the various materials used in the same.

PAPERS ON ELECTRICAL SUBJECTS.—One hour per week throughout the Senior Year is devoted to discussion by the students of subjects assigned, and important central stations are visited under the direction of the Professor of Electrical Engineering.

MECHANICAL SUBJECTS

MECHANICS OF MACHINERY.—The discussion of the principal forms of constrained motion and the means by which it may be obtained; relative motion.

Spur-wheel trains, the essential conditions of forms of wheel teeth, epicyclic gearing; other mechanisms with wheel teeth; cam trains.

The discussion of force, weight, mass, work, and power; force and work diagrams.

Miscellaneous mechanisms, differential pulley, parallel motions, bevel-gearing, skew-gearing, skew-wheels, the universal joint; friction of pairs, belts, and gear teeth; friction brakes and dynamometers.

STEAM-BOILERS.—The method of ascertaining the stresses on the different parts of a boiler, and the necessary dimensions of these parts in boiler construction. A description of the various types of boilers in use and the special adaptability of each type to special work or localities.

The characteristics of materials with their comparative values in boiler construction, and the advantages and disadvantages attending their use.

The deteriorating forces in a boiler; their influence and the means for detecting and preventing them.

Boiler-setting with relation to the size and type of boiler; the position of feed inlet, blow-out valves and pipes, safety-valves, gage-cocks, pressure gages, etc., and the manner of attaching these fittings to the boiler.

The determination of grate-surface area and proportional heating surface for the *best evaporative* efficiency; the furnace fittings and the manner of bracing or strengthening the furnace.

Types of safety-valves and other safety appliances, and the legal requirements applying to the same.

The constituents of coal and the intensity and quantity of heat evolved by its combustion. The efficiency of the different parts of the boiler in the transmission of heat for the evaporation of water.

The dimensions of the smoke-stack for the most economical combustion of coal for a given boiler-power.

VALVE-GEARS.—The graphical representation of the relation between the movement of the valve and that of the piston; the effect of the angularity of the connecting-rod upon this relation.

The solution of problems in valve gears relating to the cut-off, lap, lead and angle of advance, and the means of obtaining equal cut-off in both ends of the cylinder in an engine using an ordinary slide-valve.

Designing the valve motion for a given piston speed, and the means employed to reduce in any case the movement of the valve to that ordinarily adopted.

The types of valve motion used with engines for driving dynamos in electric power stations are carefully studied.

HYDRAULICS AND TURBINES.—The laws which govern the flow of water in pipes, through orifices and over weirs. The work available from a given quantity of water. The different types of turbine wheels, especially those used in driving dynamo machinery.

Reaction and impulse wheels, and the possible advantage of each over the other for given conditions.

Methods for regulating the flow through the wheel, and the loss resulting from partial flow in reaction turbines.

Governors and their comparative value in connection with electrical machinery.

THERMODYNAMICS.—The application of Boyle's law to the determination of the available work in a given quantity of vapor, considering the vapor acting as a perfect gas.

The comparison of the work actually obtained in a heat engine with what would be obtained if the engine worked in Carnot's cycle.

Initial condensation and the value of multiple expansion in keeping it to a minimum.

The application of thermodynamics to the pulsometer, injector, and refrigerating machines.

In connection with the work in thermodynamics, the seven engines in the Institute are used for practical application of the work done in the classroom.

These engines are regularly "indicated," and from the indicator diagrams, the horse-power and economic performance of the engine are calculated; the student carefully interprets the diagram to ascertain the condition of the steam and valves.

MECHANICS OF MATERIALS.—Tensile, compressive, and shearing stresses in rods, beams, and columns; bending moment and shearing and their application in designing structures.

The relation which the factor of safety has to the particular character of work.

The thickness of pipes to withstand allotted pressures, and the diameter and spacing of rivets when the pipes have not welded joints.

The maximum deflection allowable in beams and columns.

The application of the theorem of moments in the design of continuous beams, both free and restrained.

Columns, circular and built up sections, and the use of the various handbooks in designing columns.

Designing of shafting which is submitted to torsional, and to both torsional and deflective forces.

In connection with the study of the mechanics of materials, use is made of the Olsen testing machine. This machine is arranged for tensile, compressive, and transverse work, and is adapted to experiment on columns ten feet long; the transverse table allows a span of eighteen feet between the supports.

STEAM ENGINE.—The distinctive features of high and low speed engines; types of governors; forms and weights of fly-wheels; their relation and separate value in procuring steady speed.

The relative value of simple and compound, high and low speed engines, in driving dynamo machinery.

English Language

The object of this course is to give the student a ready command of written English. Paragraph writing is given in the form of papers prepared by the student upon subjects suggested by his other studies. In these papers he is encouraged to give his individual impressions, and in this way the practice of ready, easy writing is made the means for the cultivation of the simple, direct expression of thought.

Lectures on Building Construction

The lectures begin with building materials, including lime, cement, concrete, stone, brick, wood, etc. This leads to the discussion of foundations, walls, columns, floors, roofs, the methods of fire-proofing, and other details of buildings. A review of the history of steel construction follows and the students are made familiar with the ordinary problems involved. From time to time, working drawings are prepared to illustrate the subject under discussion. Lectures on plumbing, drainage, and ventilation close the course.

Lectures on Business Forms and Customs.

History of a bank check; promissory notes; accommodation paper and collaterals; power of attorney and protest; the mercantile agency system; failures and assignments; partnerships; domestic exchange; foreign exchange.

EVENING CLASSES

From the beginning of October until the end of March, there are two courses in Applied Electricity:—

I. *A Course of One Year*, embracing the simple theory of the electric circuit and its commercial application in lighting and power distribution, etc., with laboratory work in testing.

II. *A Systematic Course*, of two years, embracing lectures on the theory and practical application of continuous and alternating currents.

Full information as to fees, etc., will be found on page 167.

MACHINE CONSTRUCTION

FACULTY AND INSTRUCTORS

JAMES MAC ALISTER, LL. D., President of the Institute.

———————————,
Professor of Mechanical Drawing and Mechanical Engineering.

WILLIAM J. HOPKINS, S. B.,
Professor of Physics.

LIEUTENANT WILLIAM L. BAILIE, U. S. N.,
Lecturer on the Theory and Practice of the Steam Engine.

CHARLES H. WHEELER, Ph. B.,
Professor of Mathematics.

THOMAS SMITH, B. S., M. E.,
Instructor in Mechanical Drawing.

OSCAR C. SCHMIDT,
Instructor in Mechanical Drawing.

CLEMENT E. MOSSOP,
Instructor in Bench-Work and Machine Construction.

R. WILLETTE CLINGER,
Instructor in Woodwork and Pattern-Making.

THOMAS MCCREIGHT,
Instructor in Forging.

J. PETERSON RYDER, S. B.,
Director of Physical Training.

The Course in Machine Construction provides instruction in the theory of machinery, and practical training in the designing and construction of machines. It is especially adapted to young men who wish to prepare themselves for positions of responsibility in mechanical establishments. It gives them a practical working knowledge of shop-work, mathematics, mechanical drawing, and physics, as applied to the designing and construction of machinery. It also offers to those who cannot take an advanced technical course the opportunity of fitting themselves in two years for occupations in which advancement depends upon a knowledge of general scientific principles as well as upon the technical skill derived from thorough systematic training in the workshop.

COURSE OF INSTRUCTION

The course of instruction occupies two years.

JUNIOR YEAR

FIRST TERM

SHOP-WORK.—Bench-work in iron. Students complete the elementary exercises during this term.

MECHANICAL DRAWING.—The use of instruments; orthographic projection as far as the intersection and development of prisms.

MATHEMATICS.—Review of Arithmetic; the metric system of weights and measures. Algebra: through simple fractions, including the solution of some simple equations of the first degree. Practical geometry, including mensuration of surfaces and solids.

SECOND TERM

SHOP-WORK.—Elementary exercises in woodwork. Bench-work in iron. During this term the student completes some project which has been designed in the drawing-room, and unless the realization of the project includes key-fitting, special instruction is given in the same.

Mechanical Drawing.—Intersections completed. The cycloid, epicycloid, hypocycloid, and involute curves; their application to spurs and bevel gears. Logarithmic and Archimedean spirals and their application to cams.

Mathematics.—Algebra continued to quadratic equations. Practical geometry continued.

Physical Training in the Gymnasium, twice a week, during the year.

SENIOR YEAR

First Term

Shop-Work.—Woodwork: pattern-making. Forging. Machine-work both in operating and constructing.

Mechanical Drawing.—Sketching from machines; making assembled drawings of machines from sketches. Worm and worm-gears.

Mathematics.—Algebra: quadratics, ratio, proportion, and variation. Plane geometry. Descriptive geometry begun.

Physics.—Laboratory work consisting of manipulation and measurements.

Second Term

Shop-Work.—Woodwork: pattern-making. Machine-work: assembling; worm and gear work.

Mechanical Drawing.—Problems in the construction of machines; graphical representation of forces acting in machines.

Mathematics.—Algebra continued. Plane geometry continued. Descriptive geometry continued.

Physics.—Laboratory work consisting of manipulation and measurements.

Physical Training in the Gymnasium, twice a week, during the year.

CERTIFICATE

A certificate is granted to students who complete the course of instruction and pass all the required examinations.

SPECIAL COURSES

Special courses can be arranged to suit the needs of individual students.

ATTENDANCE

Students attend five days a week, from 9 a. m. to 4 p. m. The time is so divided that the knowledge acquired in the classrooms is graphically illustrated by the work in the shops.

EQUIPMENT

The machine-shop is a large and finely-appointed room and is furnished with the following machines from the best makers in the country,—Brown & Sharpe; Bement, Miles & Co.; and William Sellers & Co.: four thirteen-inch lathes, one sixteen-inch lathe, one twenty-one-inch lathe, one No. 4 universal milling machine, one mandril grinder, one six-inch slotter, one twenty-five-inch planer, one sixteen-inch vertical drill, one Dwight No. 4 sensitive drill. The motive power of the machine-shops is supplied by a thirty-five-horse-power Wetherill Corliss Engine.

The technical shops for woodwork, bench-work, and forging are unsurpassed in the completeness and perfection of their appointments.

The Physical Laboratories are supplied with extensive collections of apparatus and with every appliance necessary for the work to be done by the students.

ADMISSION

For admission to the regular course, applicants must have a good elementary education. An entrance examination in arithmetic is required.

FEES AND TERMS

The fee is *twenty-five dollars* per term.

Each student is charged *fifty cents* per term for the use of a coat-locker, with individual combination lock, which gives him the absolute control of his own property.

The fee includes all materials and tools used in the Chemical, Physical, and Electrical Laboratories, and the workshops. Students are responsible, however, for their own breakage in the laboratories and workshops. A deposit of *ten dollars* is required at the beginning of the year, which is returned at its close, less the cost of the apparatus destroyed.

The training in the Gymnasium, use of baths, etc., is included in the fee.

Students supply their own text-books, paper, and drawing instruments.

The Institute reserves the right to retain drawings and products of the workshops made by students.

There are two terms in the year, beginning in September and February, respectively.

EVENING CLASSES

From the first of October until the end of March, a course of instruction, covering nearly the same ground as the regular course, is open to students in the evening. Full details as to this course will be found on page 170.

MECHANICAL DRAWING

FACULTY AND INSTRUCTORS

JAMES MAC ALISTER, LL. D., President of the Institute.

—————————,
Professor of Mechanical Drawing.

CHARLES H. WHEELER, Ph. B.,
Professor of Mathematics.

WILLIAM J. HOPKINS, S. B.,
Professor of Physics.

THOMAS SMITH, B. S., M. E.,
Instructor in Mechanical Drawing.

OSCAR C. SCHMIDT,
Instructor in Mechanical Drawing.

CLEMENT E. MOSSOP,
Instructor in Ironwork and Machine Construction.

R. WILLETTE CLINGER,
Instructor in Woodwork and Pattern-making.

THOMAS MC CREIGHT,
Instructor in Forging.

J. PETERSON RYDER, S. B.,
Director of Physical Training.

The Course in Mechanical Drawing is intended for the training of mechanical draftsmen. The instruction is comprehensive and thorough and aims to qualify young men for the successful prosecution of an occupation in which there is a constant demand for well-trained workers. The course extends through two years, each year being divided into two terms. More than half of the student's time is devoted to mechanical drawing.

COURSE OF INSTRUCTION

JUNIOR YEAR

First Term

Mechanical Drawing.—Mechanical, free-hand. The use of instruments; lines and measurements; orthographic projection as far as the intersection and development of prisms.

Mathematics.—Review of Arithmetic; the metric system of weights and measures. Algebra: through simple fractions, including the solution of some simple equations of the first degree. Practical geometry, including mensuration of surfaces and solids.

Shop-Work.—Bench-work in iron. Students complete the elementary exercises during this term.

Second Term

Mechanical Drawing.—Mechanical, free-hand. Intersections completed. The cycloid, epicycloid, hypocycloid, and involute curves; their application to spur and bevel-gear drawing. Descriptive geometry: lines and planes.

Mathematics.—Algebra continued to quadratic equations. Practical geometry continued. Mensuration continued.

Shop-Work.—Elementary exercises in woodwork. Bench-work in iron. During this term the student completes some project which has been designed in the drawing-room, including key-fitting and scraping a cylindrical surface to a bearing.

SENIOR YEAR

FIRST TERM

MECHANICAL DRAWING.—Worm and worm-gears; solids inclined to both planes of projection and the application of the principles involved to iron-roof construction and quarter-twist belts.

MATHEMATICS.—Algebra: quadratics, ratio, proportion, and variations. Plane geometry. Descriptive geometry begun.

PHYSICS.—Laboratory work, consisting of manipulation and measurements.

SHOP-WORK.—Woodwork: pattern-making. Forging, machine-work: parts of a machine designed in the drawing-room.

SECOND TERM

MECHANICAL DRAWING.—Work from sketches; complete drawings; the designing of a machine to be constructed in the machine-shop.

MATHEMATICS.—Algebra. Plane geometry. Descriptive geometry continued.

PHYSICS.—Laboratory work, consisting of manipulation and measurements.

SHOP-WORK.—Woodwork: pattern-making. Machine-work: worm, worm-wheel, and gear-cutting.

CERTIFICATE

A certificate is given to students who complete the course of instruction and pass the required examinations.

SPECIAL COURSES

Special courses can be arranged to suit the needs of individual students.

The drawing-room, workshops, and Physical Laboratory are unsurpassed in the completeness and perfection of their appointments.

Students attend five days a week, from 9 a. m. to 4 p. m.

The Institute reserves the right to retain drawings and products of the workshops made by students.

ADMISSION

Applicants must have at least a good elementary education. An entrance examination in arithmetic is required.

FEES AND TERMS

The fee for the course is *twenty-five dollars* per term.

Each student is charged *fifty cents* per term for the use of a coat-locker, with individual combination lock, which gives him the absolute control of his own property.

The fee includes all materials and tools used in the Physical Laboratory and the workshops. Students are responsible, however, for their own breakage in the laboratories and workshops. A deposit of *five dollars* is required at the beginning of the second year, which is returned at the close of the year less the cost of the apparatus destroyed.

The training in the Gymnasium, use of baths, etc., is included in the fee.

Students supply their own text-books and drawing instruments.

There are two terms in the year, beginning in September and February, respectively.

EVENING CLASSES

From the first of October until the end of March, courses of instruction in Mechanical Drawing, Mathematics, Physics, Shop-work, and Machine Construction are open to students in the evening. Full details as to these courses will be found on page 165.

COURSES IN MATHEMATICS

INSTRUCTORS

Charles H. Wheeler, Ph. B.,
Professor of Mathematics.

Katharine F. Dill, B. S.,
Instructor in Mathematics.

COURSES OF INSTRUCTION

ALGEBRA

I. Algebra through simple fractions, including the solution of some simple equations of the first degree. Five hours a week throughout the first term of each year.

II. Algebra continued to quadratic equations, including the theory of exponents. Three hours a week throughout the second term of each year.

III. Quadratic equations, imaginaries, proportion, progressions, variations, use of logarithms. Three hours a week throughout the first term of each year.

IV. Binomial theorem, permutations, indeterminate coefficients, partial fractions, vanishing fractions. Two hours a week throughout the first term of each year.

GEOMETRY

I. Plane Geometry—the straight line. Two hours a week throughout the second term of each year.

II. Plane Geometry—the circle, similar figures. Two hours a week throughout the first term of each year.

III. Plane Geometry completed; Solid Geometry. Five hours a week throughout the second term of each year.

IV. Analytical Geometry. Five hours a week throughout the second term of each year.

MECHANICS

A course in the elements of Theoretical Mechanics, treating of statics and dynamics. The work embraces the following subjects:—

Statics.—Composition and resolution of forces, moments, couples, equilibrium of a rigid body under the action of three forces, friction, and work.

Dynamics.—Laws of motion, motion of a body under the action of gravity, impulse, work, energy, uniform motion in a circle, projectiles.

Three hours a week throughout the second term of each year.

This course requires previous knowledge of Algebra I. and II., Geometry I., II. and III., Trigonometry I.

TRIGONOMETRY

Plane Trigonometry, including the solution of right and oblique triangles. Three hours a week throughout the first term of each year.

SURVEYING

An elementary course in land surveying and direct leveling. Recitation and field work. Two hours a week throughout the second term of each year.

CALCULUS

I. The elements of the differential calculus introducing, at an early period, the integration of some simple forms, with the solution of practical problems in geometry and mechanics. Four hours a week throughout the second term of each year.

II. Continuation of Course I., taking up the treatment of more advanced subjects in both the differential and integral calculus, such as imaginaries, hyperbolic functions, curve tracing, methods of integration, rectification and areas of plane curves, volumes of solids, center of gravity. Four hours a week throughout the first term of each year.

All the above courses are *required* of students in Electrical Engineering. The courses in Analytical Geometry and Calculus are not required of students in Mechanic Arts, Machine Construction, and Mechanical Drawing.

CERTIFICATE

Certificates are granted to students who complete all the courses and pass the required examinations in the same.

REQUIREMENTS FOR ADMISSION

A knowledge of arithmetic is required for admission to Course I. in Algebra. For admission to the other courses, a satisfactory examination must be passed in all the work of the previous courses.

Application for admission should be made to the Registrar, at the Institute, between 9 a. m. and 4 p. m., or by letter.

FEES AND TERMS

Ten dollars per term for any two of the courses. The fee is the same for one course.

Students supply their own text-books and stationery.

There are two terms in the year, beginning in September and February, respectively.

EVENING CLASSES

The above courses are also offered during the evening session, with some modifications, full information concerning which will be found on page 165.

COURSES IN PHYSICS

INSTRUCTORS

WILLIAM J. HOPKINS, S. B.,
Professor of Physics.
STUART B. MOLONY,
Assistant in Physical Laboratory.

COURSES OF INSTRUCTION

I. PREPARATORY COURSE.
II. GENERAL PHYSICS.
III. ADVANCED PHYSICS.

I. PREPARATORY COURSE

The best results are obtained throughout the student's course in physics, as in other studies, when he has been trained from the beginning in habits of accurate observation and of careful manipulation. This course is designed primarily to train the student in these habits and to familiarize him with laboratory methods, teaching him logical procedure in investigation, care in manipulation, observation and the recording of events, and increasing his powers of sequential reasoning. The course is also of the greatest value as a preparation for more advanced work in physics.

All these purposes, it is thought, are best accomplished by a series of experiments covering rather fully one branch of the science and involving quantitative measurement. The subject of mechanics has been selected for the fullest treatment, inasmuch as it is the foundation of all subsequent work. The experiments, in general, admit the use of simple apparatus, and the comprehension of the principles involved is very greatly aided by the prescribed work.

The course consists, therefore, of a series of about twenty exercises to be performed independently by each student. Sufficiently explicit instructions are given to enable the student to prosecute the work intelligently, and he receives, in addition, as much personal attention from the instructor as is necessary. Occasional reviews and examinations are held for the purpose of testing the progress of the students.

The course covers the following ground:—

Measurement of length; measurement of volume; measurement of weight; composition of forces; parallel forces; center of gravity; levers and pulleys; breaking strength of wire; deflection of beams—cantilevers; deflection of beams—supported at both ends; deflection of beams—trusses; inclined plane; friction; work; composition of motions; falling bodies; the pendulum; fluid pressure; density; specific gravity; gases; the barometer; heat—conduction and cooling; testing of thermometers; sound—vibrations of strings; light—lenses and mirrors; magnetism.

For admission to this course, a knowledge of algebra through quadratics and of plane geometry is required.

II. GENERAL PHYSICS

This course consists of two lectures a week, throughout the year, with three or four hours of laboratory work each week. The lectures cover thoroughly the general subject of physics, giving a broad and simple treatment of each branch and the application of theory in practice.

The course is begun with the consideration of kinematics, followed by a very thorough treatment of mechanics, of both solids and fluids. Problems bearing upon the subject treated, all of a practical and useful nature, are given from time to time. In the second term, the subjects of heat, sound, and light are treated in a similar manner.

Electricity and magnetism are taken up in a parallel course of about ten lectures (by Professor A. J. Rowland) towards the end of the year.

The work in the laboratory consists of quantitative measurements, and is of a higher degree of accuracy than that in the Preparatory Course. The student is carefully trained in the use of the principal instruments used in physical measurement, and in methods of investigation.

The requirements for admission to this course are as follows: Preparatory Course in Physics or its equivalent; algebra through quadratics; geometry.

III. ADVANCED PHYSICS

This course consists of two lectures and two laboratory periods a week throughout the year.

The subjects of gases, heat, light, and sound are given specialized and advanced treatment, both in the lectures and in the laboratory. The experimental work is of a high grade of accuracy, and the student becomes familiar, by practice, with the most delicate and precise instruments and methods of research.

The requirements for admission to this course are as follows: General Physics (Course II., above) or its equivalent; plane trigonometry; algebra; mechanics.

SPECIAL COURSES

In addition to the regular courses offered, special courses may be arranged for those students desiring to devote more than the allotted time to the subject, or for students desiring to pursue special lines of work beyond that laid down in the regular courses.

Opportunity is offered for advanced work in experimental physics, to those competent to pursue such work.

The attention of teachers and of those intending to become teachers is particularly called to the opportunities offered for qualifying themselves for advanced work in their profession. Every possible endeavor will be made to arrange the work and the time to suit the individual needs of such persons.

CERTIFICATE

Certificates are granted to students who complete the two courses and pass the required examinations in the same.

EQUIPMENT

The Lecture-room is furnished with every convenience for scientific experiments. The laboratories are supplied with extensive collections of modern apparatus by the best French and German makers, and are fully equipped with all the appointments needed for experimental work.

ADMISSION

Application for admission should be made to the Registrar, at the Institute, between 9 a. m. and 4 p. m., or by letter.

FEES AND TERMS

Preparatory Course, *ten dollars* per term.

General Physics, *twelve dollars* per term.

Advanced Physics, *twelve dollars* per term.

For Special Courses, the fee corresponds to the amount of work undertaken.

A deposit of *five dollars*, to cover breakage in the laboratories, is required of each student. This is returned at the close of the year, less the cost of the apparatus injured.

Each student is charged *fifty cents* per term for the use of a coat-locker, with individual combination lock, which gives him the absolute control of his own property.

Students supply their own text-books and stationery.

There are two terms in the year, beginning in September and February, respectively.

EVENING CLASSES

Courses in General Physics are given during the winter months, full information concerning which will be found on page 167.

COURSES IN CHEMISTRY

INSTRUCTORS

Ernest Arnold Congdon, Ph. B.,
Professor of Chemistry.
Abraham Henwood,
Instructor in Chemistry.

COURSES OF INSTRUCTION

I. General Chemistry.
II. Qualitative Analysis.
III. Quantitative Analysis.
IV. Organic Chemistry.
V. Lectures on the Chemistry of Foods and Dietetics.
VI. Lectures on the Chemistry of Textiles, Dyeing, and Cleansing.

I. GENERAL CHEMISTR

A course of lectures and laboratory work extending through one year, with frequent oral, and occasional written, examinations. Two lectures and two laboratory periods per week.

The lectures are fully illustrated by experiments, charts and diagrams, specimens, and lantern views.

The instruction is made thorough and practical by constant personal supervision in the laboratories.

The student is trained to deduce the more important facts of the science, to study the comparative properties of substances, and particularly to acquire a scientific habit of thought.

Full notes are taken by the students at the lectures, and complete records of their laboratory work, including descriptions and sketches, are kept in books which are examined weekly.

II. QUALITATIVE ANALYSIS

This course extends through one year, and consists of lectures and laboratory work, with frequent oral, and occasional written, examinations. One lecture and one laboratory period per week.

The student first studies the reaction of the more common metals. After this preliminary work, he analyzes solutions containing the metals, beginning with solutions of the separate groups of metals, and afterwards analyzing solutions containing all the metals studied.

In like manner the acids are next studied, and a set of solutions analyzed. The student then proceeds to analyze solutions that may contain all of the bases and acids studied; after which, general miscellaneous qualitative work is taken up, such as the examination of powders, insoluble substances, alloys, and such special work as time permits.

III. QUANTITATIVE ANALYSIS

There are three courses in Quantitative Analysis.

A. GENERAL COURSE

The instruction extends over two years, and consists of lectures, recitations, and laboratory work. The laboratory work aims to be thorough and sufficiently comprehensive, including pure salts, minerals and ores, alloys, water, gas, and technical products.

The lectures and recitations cover the methods used for the determination and separation of the common elements in their various forms of combination. A thorough drill in stoichiometric problems is also made an important feature of the work.

The laboratory work is individual in its character—the progress of the student depending upon his ability and industry.

B. TECHNICAL ANALYSIS

This course is designed to meet the needs of engineering students. It is limited in its scope, embracing only what are regarded as essentials.

Fuel.—Proximate analysis of coal; moisture, volatile matter, coke, ash, and sulphur. Specific gravity and calorific value.

Gas.—Determinations of carbon di-oxide, oxygen, carbon monoxide, hydrogen and nitrogen, employing the Elliot, Fisher-Orsat, and Hempel forms of apparatus.

Water.—Total solid matter, temporary and permanent hardness, chlorides, sulphates, nitrates, also silica, iron oxide, alumina, lime, magnesia, potash, and soda.

Lubricating Oil.—Specific gravity, viscosity, cold test, flashing point, loss in weight on exposure to elevated temperatures, tendency to oxidize and gum, percentage of mineral and of fatty oil, free fatty acid, free mineral acid, suspended matters, rosin oil.

One laboratory period and one recitation per week throughout the year.

C. FOOD ANALYSIS

Practical laboratory experience with the processes in present use for the analysis of food materials is made the basis of the instruction. The laboratory work is of such a character as to furnish data for the calculation of food values as well as to detect adulterations. The following list indicates the general scope of the quantitative work: chemically pure salts; potable water; common salt; bicarbonate of sodium; flour or bread; baking-powders; sugar or syrups; milk; butter; lard; cheese; tea; coffee; chocolate.

IV. ORGANIC CHEMISTRY

The chemistry of the hydrocarbons and their derivatives. This course embraces lectures and laboratory work with frequent oral, and occasional written, examinations. One lecture and two laboratory periods per week.

The lectures are based upon a printed syllabus, prepared especially for the use of students.

V. LECTURES ON THE CHEMISTRY OF FOODS AND DIETETICS

A course of twelve lectures.

In this course the subject is treated, so far as possible, from the chemical standpoint. The chemical composition and relationship of substances used as foods are explained, as well as the changes brought about by the application of heat (as in cooking), and also changes produced by other means, such as vital forces, fermentation, and the general chemical reactions of bodies.

The following subjects are included in the lectures: definitions of foods—chemical composition of food materials and of the human body; proximate food principles—protein, fat, carbohydrates, water, mineral matter; value of foods; use of calories; nutrient ratio; metabolism of foods; diet and dietaries; food materials—water (potable and mineral), common salt, starch foods, sugars, fats and oils, cereals, meats, eggs, fish, fruits, vegetables, salads, beverages, food adjuncts; study of fermentation; preparation of food materials; changes that foods undergo in cooking processes.

A syllabus of the course has been prepared for the use of students.

VI. LECTURES ON TEXTILES, DYEING, AND CLEANSING

This course includes a brief historical sketch of the use of textiles and the art of dyeing.

This is followed by a description of the more important textiles—cotton, flax, ramie, wool, and silk—and of the microscopical and chemical methods of ascertaining their organic structure.

The materials used in dyeing and the operations preliminary to it, and the chemistry of washing, cleaning, bleaching, and dyeing are explained.

Some account is given of the natural and artificial coloring matters and of the chemistry of the coal-tar colors, which completes the course.

CERTIFICATE

Certificates are granted to students who complete Courses I., II., III., and IV., and pass the required examinations in the same.

LABORATORIES

The main laboratory is a large and well-appointed room. It is well lighted and has accommodations for one hundred and seventy students. The ventilation is excellent—a most important feature and one that bears directly on the comfort and health of the students. The special features of the laboratory are: the placing of the sinks upon the desks, so that every four students use the same sink; the fume closets or hoods, which are perfectly arranged and, by means of an artificial draft, carry off all noxious vapors and acid fumes; the shelving on each desk holding the reagent bottles, arranged in such a manner as not to interfere with the supply of light.

There are smaller laboratories equipped for quantitative analysis and special lines of work.

The Lecture-hall has accommodations for over three hundred students, and is fitted up with every appliance for scientific demonstration.

REQUIREMENTS FOR ADMISSION

No previous knowledge of chemistry is required for admission to the General Course, but a knowledge of the metric system is essential.

For admission to the Second Course, students must have completed the General Course or its equivalent.

The Third and Fourth Courses may be taken in order by students who have completed the first two courses or their equivalents.

A knowledge of General Chemistry is required for admission to the Lectures on the Chemistry of Foods.

No special preparation is required for admission to the Lectures on the Chemistry of Textiles, Dyeing, and Cleansing.

FEES AND TERMS

Courses in General Chemistry, Qualitative Analysis, Quantitative Analysis, and Organic Chemistry, each *twelve dollars* per term.

For the courses of lectures in the Chemistry of Foods and in Textiles, Dyeing, and Cleansing, each *two dollars.*

Students supply their own text-books and stationery.

Common chemicals used in the laboratory are supplied to the students free of charge.

A deposit of *five dollars*, to cover breakage of apparatus, is required of each student taking the laboratory work. This is returned at the close of the year, less the cost of the apparatus destroyed.

Each student is charged *fifty cents* per term for the use of a coat locker, with individual combination lock, which gives him the absolute control of his own property.

There are two terms in the year, beginning in September and February, respectively.

EVENING CLASSES

Courses in Elementary and Advanced Chemistry, with laboratory work, are given from the beginning of October until the end of March. Full details of these courses will be found on page 166.

DEPARTMENT OF COMMERCE AND FINANCE

FACULTY AND INSTRUCTORS

James MacAlister, LL. D., President of the Institute.

Parke Schoch, A. M., Director,
Professor of The History and Mechanism of Commerce, and Stenography.

Jonathan J. Sparling,
Professor of The Theory and Practice of Accounts.

Carl Lewis Altmaier,
Professor of Commercial Law and Instructor in Correspondence and Typewriting.

John T. Holdsworth,
Associate Professor of Commercial Geography and Banking.

Calixto Guitéras, C. E.,
Professor of Spanish.

Carolyn H. Locke,
Instructor in Stenography.

Harriet L. Mason,
Chief Instructor in English.

Annie P. Shedden,
Instructor in English.

Maude G. Hopkins,
J. Peterson Ryder, S. B.,
Directors of Physical Training.

The Department of Commerce and Finance is founded on a broad and liberal basis. In its general features, it resembles the commercial schools of Europe, and is intended to place commercial education in its proper relation to other departments of educational work. The object of the course is to train young men to do business rather than simply to record business. The field of business will never be wholly occupied. It will always offer large privilege and rich reward to the right kind of ability. No other field presents larger inducements or implies greater responsibilities; no other field draws more largely upon the ranks of able and ambitious young men. Modern business has grown so complex and its requirements are so exacting that a knowledge of its laws, customs, and tendencies is necessary, not only to success, but to a comfortable existence. Every successful man is, in a sense, a successful business man.

The department has been organized with the view of meeting these conditions. It provides a liberal, and, at the same time, thoroughly practical course of study, including two years' training in a knowledge of the world's industries and their markets, the laws of trade and finance, and the mechanism and customs of business.

Besides the systematic course of two years, there are three distinct Office Courses, each occupying one year and leading directly to a specific line of employment. A course is offered for teachers who wish to fit themselves for commercial high-school work.

COURSES OF INSTRUCTION

The Department is organized, as follows:—

I. COURSE IN COMMERCE AND FINANCE.
II. COMMERCIAL COURSE FOR TEACHERS.
III. OFFICE COURSES.
IV. EVENING COURSES.

I. COURSE IN COMMERCE AND FINANCE

The aim of the Course in Commerce and Finance is to give young men and young women thorough fundamental training for the activities of business which include: (1) The production, manufacture, sale, and transportation of articles of commerce; (2) the management of stock companies and corporations; (3) the buying and selling of securities; (4) the importing and exporting of merchandise; (5) the borrowing and lending of money and credit; (6) the advertising of commercial concerns; (7) the keeping of business records; (8) a knowledge of the Spanish language.

The work of this course is divided into two years, as follows:—

JUNIOR YEAR

FIRST TERM

LANGUAGE.—Composition; letter-writing. American classics.

COMMERCIAL ARITHMETIC.—Weights and measures; metric system; trade standards and prices; wages and pay-rolls; commercial interest and discount; speed practice.

BUSINESS CUSTOMS.—Invoices; commercial paper; bills of lading and manifests; vouchers.

BOOKKEEPING.—Principles and practice of single and double entry; simple transactions; business forms.

PENMANSHIP.—A plain, rapid business hand.

TYPEWRITING.—Word exercises; study of mechanism of machine; transcribing from rough draft.

CORRESPONDENCE.—Mechanical arrangement and style of business letter; exercises in condensing and expanding.

COMMERCIAL GEOGRAPHY.—Physical and mathematical geography in their relations to commerce. Commercial geography of the United States.

SECOND TERM

LANGUAGE.—Grammatical principles; diction. Selected classics.

INDUSTRIAL ARITHMETIC.—Measurements; builders' and contractors' bids and estimates; scientific measurements; manufacturers' and mechanics' estimates; metric system.

BUSINESS CUSTOMS.—Securities; collections; discounts.

BOOKKEEPING.—Principles and practice of single and double entry in more complicated transactions. Shipments, consignments, and business forms.

COMMERCIAL CALCULATIONS.—Practical exercises for acquiring rapidity and accuracy of work.

COMMERCIAL GEOGRAPHY.—Industrial and economic geography of the United States. Study of the world's commercial staples, raw and manufactured.

PENMANSHIP.—Continued.

TYPEWRITING.—Continued.

CORRESPONDENCE.—Letters relating to contracts, purchases and sales, recommendations, introduction, credit; circulars, telegrams.

PUBLIC SPEAKING.—One hour a week, throughout the year.

PHYSICAL TRAINING in the gymnasium, twice a week, throughout the year.

SENIOR YEAR

FIRST TERM

LANGUAGE.—Rhetorical principles; essay-writing. English classics.

ADVANCED BOOKKEEPING.—Importing and jobbing; wholesale and retail; manufacturing, real estate, joint-stock companies, corporations, banking, etc. Introducing order-book, cash-book, invoice and sales register, special column journal, bill-book.

Banking and Finance.—Outlines of the history of banking and of the National banking system, state banks, savings-banks, trust and financial companies.

Commercial Arithmetic.—Financial problems involving partial payments; buying and selling exchanges; stocks and bonds; equating of accounts; adjusting of partnership; joint-stock company and corporation accounts.

Commercial Geography.—A comparative study of the commerce and industry of the five great commercial nations of the world.

History of Commerce.—Outlines of the history of ancient, medieval, and modern commerce, with special reference to the history of American commerce.

Civics.—Principles and practical operation of government in the United States.

Spanish Language.—Elective.

Typewriting.—Arrangement of papers.

Second Term

Language.—Historical outlines of English and American literature.

Advanced Bookkeeping.—Continued.

Commercial Arithmetic.—Continued.

Banking and Finance.—Bank management, mechanism, and practice of banking; the clearing-house; currency reform.

Commercial Geography.—Continued. Special studies requiring independent research.

Mechanism of Commerce.—Boards of trade; stock and produce exchanges; transportation; interstate commerce; warehousing; importing and exporting; duties; exchange; mercantile agencies.

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Commercial Law.—Elementary principles of contracts and negotiable paper and the leading principles which regulate the relations of the business man,—principal and agent; carriers; commission merchants; partnerships; joint-stock companies; corporations.

Civics.—Principles and practical operation of government in the United States.

Business Printing and Advertising.—Type and paper; printers' estimates; proof-reading; business cards, circulars, and catalogues. Modern advertising, including mediums, rates, agencies.

Spanish Language.—Elective.

Public Speaking.—One hour a week, throughout the year.

Physical Training in the gymnasium, twice a week, throughout the year.

The stereopticon is freely used in the classroom as an aid in teaching the history and mechanism of commerce, commercial geography, and other subjects.

During the Senior Year, visits are made to some of the leading industrial and commercial establishments of Philadelphia, and systematic use is made of the Philadelphia Commercial Museums in the study of commercial geography.

II. COMMERCIAL COURSE FOR TEACHERS

In order to meet the growing demand for specially trained commercial teachers, the Institute offers instruction in the Senior-year work of the Commerce and Finance Course to men and women who wish to equip themselves for entrance upon this new and widening field of high-school work.

For admission to this course, the applicant must have had at least two years' experience in teaching, and must show an equivalent of the Junior-year work.

An applicant having no knowledge of bookkeeping, but being amply equipped in all other lines, can, in one year, complete the bookkeeping required in the two years of the Commerce and Finance Course.

Students who enter this course are given special consideration by the professors and instructors of the department, generous assistance being offered in the way of suggestions as to methods of teaching, the preparation of outlines, and the bibliography of the several subjects.

The Institute, in its complete reference libraries, its museum, its courses of free lectures and concerts, and its various departments of educational work, offers superior advantages to the student looking to teaching as a profession.

The course occupies one year of two terms.

DIPLOMA

The Diploma of the Institute is granted to students who complete the work of either the Course in Commerce and Finance or the Commercial Course for Teachers and pass the prescribed examinations.

III. OFFICE COURSES

Three distinct Office Courses are offered. These are thoroughly practical in character, and are adapted to prepare young men and young women for entering immediately upon the respective lines of employment to which the training leads.

BOOKKEEPING COURSE

The object of this course is to prepare young men and young women for positions as bookkeepers. It occupies one year, divided into two terms, and includes the following subjects:—

BOOKKEEPING.—Single and double entry; use of auxiliary books; order-books, cash-books, invoice and sales register, bill-book, special column journal, etc.

COMMERCIAL ARITHMETIC.—Weights, measures; metric system; builders', manufacturers', mechanics' estimates; partial payments; exchanges, stocks, bonds, partnerships, joint-stock companies and corporations; speed practice.

BUSINESS FORMS AND CUSTOMS.—Invoices, commercial paper, bills of lading and manifests; vouchers.

ENGLISH.—Composition; letter writing; grammatical principles. American classics.

TYPEWRITING.—Word exercise; mechanism of machine; transcribing from rough drafts; arrangement of papers.

PUBLIC SPEAKING.—One hour a week for young men.

PHYSICAL TRAINING.—In the gymnasium, twice a week.

STENOGRAPHY COURSE

The aim of this course is to train young men and young women for positions as stenographers and typewriters. There is a growing demand among business men for stenographers who can not only take down and typewrite correspondence, but who have a serviceable knowledge of good English and who are intelligently trained along general educational lines.

The course occupies one year, divided into two terms, and includes the following subjects:

STENOGRAPHY.—*First Term*—Theory of Pitman System: daily drill in phonetics. *Second Term*—Practice of the art by means of carefully graded dictation exercises, and daily transcript of notes.

TYPEWRITING.—Word exercises; study of leading typewriters; transcribing from rough draft; arrangement of papers. Instruction in duplicating processes; letter press; office practice.

ENGLISH.—Composition; letter writing; grammatical principles. Selected American or English poets.

ACCOUNTS.—Elements of single and double entry bookkeeping.

BUSINESS FORMS AND CUSTOMS.—Invoices, commercial paper, vouchers, etc.

PHYSICAL TRAINING.—In the gymnasium, twice a week.

PRIVATE SECRETARY COURSE

This course has been organized to respond to applications that have been made to the Institute for clerks fitted to do work of a more general character and of a higher grade than that required in a purely business office. Applicants for admission must show by examination, or otherwise, that they are prepared to profit by the training given in this course.

The course occupies one year, divided into two terms, and includes the following subjects:—

STENOGRAPHY, TYPEWRITING, ACCOUNTS, BUSINESS FORMS AND CUSTOMS.—The work in these subjects is the same as outlined in the Stenography Course.

ENGLISH.—Rhetorical principles; essay writing; collection and arrangement of material; criticism of manuscript. English classics.

CORRESPONDENCE.—Arrangement and style of business letters; letters of recommendation, introduction, etc.; circulars, telegrams.

PENMANSHIP.

BUSINESS PRINTING.—Type and paper; printers' estimates; proof-reading.

PHYSICAL TRAINING.—In the gymnasium, twice a week.

CERTIFICATES

Certificates are granted to students who complete any one of the Office Courses and pass the prescribed examinations.

GYMNASIUM

The Gymnasium is a large, airy room, completely equipped in accordance with the requirements of the Swedish system of physical training and with dressing-rooms, and bath-rooms supplied with hot and cold water. All the training is conducted under the immediate supervision of the Directors.

COMMERCIAL MUSEUM

A beginning was made in 1895 towards the formation of a permanent Commercial Museum, and a large collection of raw and manufactured products has already been secured. The collection represents quite fully the following industrial products: Flour; wool; petroleum; teas and coffees; sugar; cotton; copper; iron and steel; glass; tobacco; leather; rubber; paper; wood; carpet; linen; spices; aluminum; building stone; brick and terra cotta. Additions are being made constantly, and the student who is looking forward to devoting his life to trade, shipping, or manufacturing, has opportunity, in connection with his academic work, to make a special study, from both a geographic and an economic standpoint, of the particular industry in which he is interested.

ART MUSEUM

The Art Museum contains extensive collections representing the industrial arts of Egypt, India, China, Japan, and Europe.

LIBRARY

The Library, which contains twenty-four thousand volumes, is supplied with books, periodicals, and pamphlets bearing upon the work of the department, and every facility and assistance is afforded for the study of financial, economic, and commercial questions.

ADMISSION

Applicants for admission to any of the courses must pass satisfactory examinations in English, Geography, Arithmetic, and United States History.

For admission to the Course in Commerce and Finance, or to any of the Office Courses, candidates must be at least sixteen years of age.

The diploma of high schools of approved standing is accepted in place of an examination.

Application for admission should be made to the Registrar, at the Institute, between 9 a. m. and 4 p. m., or by letter.

FEES AND TERMS

Course in Commerce and Finance, *twenty-five dollars* per term.

Commercial Course for Teachers, *thirty dollars* per term.

Office Courses, *twenty-five dollars* per term, each.

Students provide their own text-books and stationery.

Coat-lockers, with individual combination locks, are provided for the men students, giving to each the absolute control of his own property. Each student is charged *fifty cents* per term for a locker.

A deposit of *one dollar* is required of each student for necessary keys. This deposit is refunded at the end of the year, on return of the keys.

There are two terms in the year, beginning in September and February, respectively. Five days' attendance a week is required, from 9 a. m. until 2 p. m.

EVENING CLASSES

The Department of Evening Classes is fully organized, and includes the following courses in commercial instruction:—

1. A Systematic Course in Bookkeeping, Commercial Arithmetic, and Penmanship.
2. Office Course in Stenography and Typewriting.

Fee for each of the courses, for the entire session of six months, *five dollars.*

Full details of these courses will be found on page 169.

JUNIOR COURSES

IN

DOMESTIC SCIENCE AND ARTS

AND

ADVANCED ELECTIVE COURSES

FACULTY AND INSTRUCTORS

JAMES MACALISTER, LL. D., President of the Institute.

ALICE M. BRENNAN, Director, Instructor in English.

ERNEST A. CONGDON, Ph. B., Professor of Chemistry.

CHARLES H. WHEELER, Ph. B., Professor of Mathematics.

ALBERT P. BRUBAKER, M. D., Professor of Physiology and Hygiene.

HARRIET L. MASON, Chief Instructor in English Language and Literature.

ANNIE P. SHEDDEN, Instructor in History.

JOHN T. HOLDSWORTH, Instructor in Civics.

ABRAHAM HENWOOD, Instructor in Chemistry.

MARGARET C. LIMERICK, Instructor in Cookery.

CAROLINE A. M. HALL, Director of the Courses in Dressmaking, and Instructor in Sewing.

MARY E. FRATZ, Instructor in Drawing.

JONATHAN J. SPARLING, Instructor in Business Methods and Accounts.

HARRIET E. GAYLEY, Instructor in Cookery.

MARY L. SARGENT, Instructor in Dressmaking.

EMILY G. SWETT, Instructor in Millinery.

JAMES L. WOOD, Lecturer on The History of Art.

ARTHUR TRUSCOTT, Lecturer on Domestic Architecture.

ALICE J. MORSE, Lecturer on The Decoration and Furnishing of the House.

MAUDE G. HOPKINS, Director of Physical Training.

COURSES OF INSTRUCTION

The following Courses are offered:—

I. Junior Course.

II. Elective Courses for Advanced Students.

I. JUNIOR COURSE

The Junior Course is a non-professional course of prescribed studies for girls, and is designed: (1) To supply that training for the duties and responsibilities of home life which the ordinary academic education fails to give; (2) to lay a broad and solid foundation for the technical work involved in the direct preparation for a profession or a skilled occupation. The course of instruction covers two years.

The course is based upon the recognition of the fact that the training for the practical business of life should have its due place in the education of the individual during the plastic period of life. Experience is constantly showing the soundness of this position.

Of the classes that have thus far been graduated, more than three-fourths of the pupils have developed aptitudes for one or another of the arts and sciences, and have taken advanced courses in chemistry, physiology and hygiene, domestic science, millinery, or dressmaking, with a view, in each case, to following the pursuit as a profession.

As a result of this preparatory training in a well-arranged and soundly correlated course of study, these pupils have the advantage of entering upon the pursuit of their technical courses with good habits of thought and study, and with the ability to feel an intelligent delight in their work.

The course is divided broadly into scientific work, academic work, and technical work—about one-third of the time being given to each.

The list of studies is as follows:

JUNIOR YEAR

FIRST TERM

LANGUAGE AND LITERATURE.—Diction, punctuation, letter-writing. Idylls of the King. History of American literature.

GENERAL HISTORY.—Ancient history.

MATHEMATICS.—Review of principles of arithmetic and the metric system, introductory to the study of algebra; algebra begun.

DOMESTIC SCIENCE AND ARTS.—Household economics: cookery—practical instruction in the school-kitchens; talks on foods. Sewing. Millinery.

BUSINESS CUSTOMS AND ACCOUNTS.

DRAWING.—Free-hand; sketching.

PHYSICAL TRAINING in the gymnasium, twice a week, throughout the year.

SECOND TERM

LANGUAGE AND LITERATURE.—Figures of speech, sentence structure, etymology, composition. History of American literature.

MATHEMATICS.—Elementary algebra, continued. Geometry: a short course in the elements of plane geometry with some of its practical applications.

GENERAL HISTORY.—Medieval and modern European history.

Domestic Science and Arts.—Household economics: cookery—practical instruction in the school-kitchens; talks on foods. Sewing. Millinery.

Business Customs and Accounts.

Drawing.—Free-hand; sketching.

Physical Training in the gymnasium, twice a week, throughout the year.

Current Events one hour a week during the year.

SENIOR YEAR

First Term

Language and Literature.—Choice of words, phraseology, synonyms. Selected plays of Shakespeare. History of English literature.

Science.—Physiology and hygiene. Elements of general chemistry—lectures, laboratory work, and recitations.

Domestic Science and Arts.—Household economics: lectures on care of the house; practical instruction in the school-kitchens. Dressmaking.

Civics.—The principles and practical operation of civil government in the United States.

Lectures on The History of Art.

Second Term

Language and Literature.—The paragraph, composition, principles of style. Selected plays of Shakespeare. History of English literature.

Science.—Elements of general chemistry—lectures, laboratory work, and recitations.

Domestic Science and Arts.—Dressmaking.

Civics.—Continued.

DOMESTIC ARCHITECTURE.—The planning and building of the House.

THE DECORATION AND FURNISHING OF THE HOUSE.

II. ELECTIVE COURSES FOR ADVANCED STUDENTS

The Elective Courses are intended only for *advanced students* who are qualified to make a choice of studies for specialization. These courses are designed for young women who desire a course of training in the sciences or arts, combining with such training, when necessary, courses in the academic branches.

Students may elect a single study or a group course from the several courses specified below.

The Institute affords superior advantages for students who wish to specialize. The following subjects are offered :—

SCIENCE.—Mathematics, Physics, Chemistry, Physiology and Hygiene, Physical Training. (See Special Circulars for the various courses.)

ENGLISH.—Rhetoric and Composition, American and English Literature, Prose Style, Popular Studies in Old World Literature, Civics and History. (See Special Circulars.)

DOMESTIC SCIENCE AND ARTS.—Cookery, Millinery, Dressmaking, Household Economy, Chemistry of Foods.

ATTENDANCE

In the regular prescribed courses, attendance five days a week, and, upon an average, five hours a day, is required.

Work begins at 9 a. m., and continues to such hours (up to four o'clock) as the program of studies demands.

The attendance for the Elective Courses varies according to the program for the selected course of study.

GRADUATION

A Diploma is awarded to students who complete the prescribed course.

A Certificate is awarded to students who complete an Elective Course consisting of subjects approved by the Director.

LABORATORIES AND WORKROOMS

The laboratories and workrooms of the Institute are equipped with all the latest appliances, and every facility is afforded the student to pursue the work in a thoroughly scientific manner.

LIBRARY AND MUSEUM

Constant use is made of the Library, in connection with the several lines of study and training. It contains twenty-four thousand volumes, including works in every department of art, literature, science, and technology. The Reading-room is liberally supplied with periodicals.

The Museum, which contains collections in every department of industrial art and a collection of paintings, is an important adjunct to many of the branches of instruction.

ADMISSION

For admission to the Junior Course, applicants must have at least a good elementary education. An examination in English, United States History, Geography, and Arithmetic is required. Applicants for the Elective Courses must have such preparation as will enable them to pursue profitably the subjects chosen.

A high-school diploma, or a certificate or diploma of any institution of equal grade with the high-school, may be accepted in lieu of an examination, provided the application is made in person.

Application for admission should be made to the Registrar, at the Institute, between 9 a. m. and 4 p. m., or by letter.

FEES AND TERMS

Junior Course, *thirty-five dollars* per term. Advanced Elective Courses, according to the group of subjects chosen.

The cost of the materials used in the science and the cookery classes is included in the fee.

All the materials used in the dressmaking and millinery classes and all text-books and stationery are supplied by the student.

A deposit of *five dollars* must be made by each student taking chemistry or physics, to cover breakage in the laboratory. This is returned at the close of the year, less the cost of the apparatus destroyed. A deposit of *fifty cents* per term is also required as security for the return of the locker key.

There are two terms in the year, beginning in September and February, respectively.

For further information, apply to Miss Brennan, Director.

SUBJECTS OF INSTRUCTION

The following outlines furnish information frequently asked for concerning some of the subjects of instruction embraced in the Junior and Elective Courses:

ELEMENTARY CHEMISTRY.—A systematic course, extending throughout the year. The student devotes three hours a week to the study, two hours being given to laboratory work and one hour to lectures and recitations. There are occasional written examinations, held at the discretion of the instructor. While the course is elementary in its nature, it is intended to train the student in the power of observation, to give correct interpretations of what is observed, and particularly to inculcate a scientific habit of thought and reasoning. Nor is the training in manipulation and the arrangement of apparatus the least valuable part of the course.

ANATOMY, PHYSIOLOGY, AND HYGIENE.—During the larger part of the Senior Year, the instruction embraces a course of lectures on the general anatomy and physiology of the human body. These lectures, given twice a week, are fully illustrated by diagrams, models, and demonstrations of the more important subjects.

A course of fifteen lectures on personal, domestic, and public hygiene supplements and concludes the instruction.

HOUSEHOLD ECONOMICS.—This term covers broadly the instruction in the various subjects that relate to the growth and well-being of the household and of organized society. The instruction is given in a series of lectures and lessons systematically arranged with a view to correlating kindred subjects in their bearing upon the household and upon social life and organization.

The following general outline indicates the scope of the work. It will be noted that every part of the instruction capable of demonstration has its outcome in actual laboratory work.

During the Junior Year, instruction is given in the following subjects: The chemistry of food in its relation to the body; composition of foods; combinations of foods; economy in foods; combustion; classification of food principles—water, ash, carbohydrates, fat, proteids; proportion of food principles present in vegetables, cereals, eggs, milk, cheese, meat, fish; yeast; baking-powders; food adjuncts.

The instruction in cookery during the Senior Year embraces a thorough course in all the ordinary processes of cookery, with individual practice at each lesson. Each pupil performs the whole of the process treated in the lesson, and produces a complete dish from a given receipt. Of the three hours a week, two are given to practice and one to theory.

Lectures are given on the care of the house, including: the kitchen; chemicals for household use; care and cleaning of silver, nickel, iron, paints, copper, tin, marble, woodwork, brass, zinc, porcelain, glass; disposal of household waste; water supply; filtration of water; heating and lighting; care of lamps; care of the dining-room; laundry of table-linen; removal of stains; laundry of lace; care of bath-room and bed-room.

The lectures cover one hour each week, followed by practice in the school-kitchens.

SEWING.—Practice is given in the various stitches upon small pieces of material varying from coarser to finer texture. Students provide these materials. Three lessons of one hour a week are given, embracing: *First Term*—Training in measuring by tape-measure and by the eye; basting and overhanding; turning hem by measure, hemming, and running; stitching, combination of stitches; hemstitching; fells; gathering, stroking gathers, and putting on bands; tucks; making a fancy apron. *Second Term*—Sewing machine; making button-holes and eyelets; sewing on buttons; putting in gussets; plackets; mending and patching; drafting, cutting, and making three undergarments.

MILLINERY.—The fundamental principles of trimming and making hats, with thorough practice in wiring, binding, puffing, facing (plain and shirred), covering of buckram frames, trimming hats in choice materials, making of shirred hats. The course fits the pupil to do thoroughly all her home millinery, and forms a solid basis for a professional course.

DRESSMAKING.—Talks on materials used in a dress—manufacture from staple articles: cotton, wool, silk, etc.; talks on color and color combinations in materials; linings and trimmings; drafting for skirt; purchase of materials; planning, cutting, and making a house-dress; making a separate skirt; making a shirt-waist; planning, cutting, and making gown for graduation.

BUSINESS TRAINING.—A course of instruction designed to acquaint women with those common business facts and principles which have been generally omitted in a woman's education. The following topics indicate the nature of the instruction: What is money? How is it circulated? What is a bank? A trust company? How do banks and trust companies make their money? Women as stockholders and bondholders. Business papers—checks, promissory notes, etc. Capital and credit, failures, assignments, the legal status of women. Practical work in drawing checks, notes, etc., and in keeping a simple set of books—cash-book, day-book, and ledger—by double entry.

PHYSICAL TRAINING.—The importance of physical training in mental and moral, as well as in physical, development can scarcely be overestimated. Great care has therefore been taken to formulate a system of training in accordance with the best recognized theories of human development. The gymnasium is thoroughly fitted up with the newest and best apparatus for the work, including the bath with all necessary appliances.

Regular students are required to take this course, and special students are strongly advised to do so. In the case of regular students, no additional fee is charged for the course in the gymnasium.

COURSES IN COOKERY AND HOUSEHOLD ECONOMICS

INSTRUCTORS

Helen M. Spring, Director,
Instructor in Cookery and Household Economics.

Catherine J. Coolidge,
Instructor in Bacteriology.

Ellen Morris,
Instructor in Cookery.

Margaret C. Limerick,
Instructor in Cookery.

Harriet E. Gayley,
Instructor in Cookery.

Fannie K. Wardell,
Instructor in Cookery.

COURSES OF INSTRUCTION

The following courses in Cookery and other subjects connected with the household are offered:—

I. General Cookery.
II. Invalid Cookery.
III. Housekeepers Course.
IV. Talks on Food Materials and Other Matters Relating to the Household.
V. Course for Waitresses.

VI. COURSE IN LAUNDRY WORK.

VII. CHILDREN'S SATURDAY MORNING CLASS.

VIII. NORMAL COURSE IN DOMESTIC SCIENCE.

IX. EVENING CLASSES IN GENERAL COOKERY.

I. GENERAL COOKERY

There are three courses in General Cookery. Each course occupies one term and is complete in itself. The three courses are consecutive and must be taken up in regular order.

FIRST COURSE.—Instruction in the composition and dietetic value of food materials. The lessons are arranged in logical order, and each principle is illustrated by the preparation of simple dishes. The instruction is largely individual, each student preparing an entire dish. The object of the course is the preparation of food in the most digestible and appetizing forms.

SECOND COURSE.—Instruction and practice of an advanced character in the preparation of more complicated dishes and menus than are included in the First Course.

THIRD COURSE.—This course includes the preparation of still more elaborate and expensive dishes; lessons in marketing and carving; practical demonstration in the cutting of meat.

In each course, one lesson, of three hours, is given weekly.

II. INVALID COOKERY

The course is intended for professional nurses and other persons desirous of acquiring a practical knowledge of cookery suitable for the sick-room. The course extends throughout one term, with one lesson, of two and one-half hours, each week. A carefully prepared syllabus is made the basis of the instruction.

Classes of medical students desirous of taking the course can receive instruction in the afternoon or evening.

III. HOUSEKEEPERS COURSE

This course is offered in the belief that greater skill and intelligence are needed in the management of the home, and for the purpose of providing thorough training for women possessing the requisite qualifications to fit themselves for positions as housekeepers or as matrons of public institutions. The course occupies one year. It embraces the following subjects: The General Courses in Cookery; the Course in Invalid Cookery; Course in Lunch-room Cookery; Course for Waitresses; Marketing; Lectures on Physiology and Hygiene; Familiar Talks on Food Materials and other matters relating to the Household; the Course in Laundry Work; Business Forms and Accounts.

IV. Talks on Food Materials and Other Matters Relating to the Household

This course is intended to present the scientific, hygienic, and sanitary features of the household in such a manner as will prove of practical benefit to women who manage their own homes. It supplies the kind of information needed by young women preparing themselves for household duties and responsibilities. The course occupies one term. The instruction embraces the following subjects: Composition and nutritive value of foods; comparative value of animal and vegetable foods; home kitchens and public kitchens; use of coal-stoves and ranges, oil and gas-stoves, Aladdin oven; buying of supplies; cold storage; marketing; national and state laws regarding the inspection of meat; canned goods; food adulterations; water, filters; tea, coffee, cocoa, and other beverages; cereals, vegetables, fruits; breads, flour, yeast; dairy products—milk, cheese, butter.

V. Course for Waitresses

A course of six lessons, including the following subjects in which every well-trained waitress should be expert: Care of dining-room and pantry; care of silver and cutlery; serving of breakfast, luncheon, and dinner; washing dishes; washing and ironing table linen; removal of stains.

The classes meet in the afternoon or evening. Each lesson occupies two hours.

VI. Laundry Work

Practice in washing and ironing fabrics and articles of various kinds. Instruction is given in the scientific principles of laundry work as well as practical training in the laundry. It is intended for students taking the Normal Course, and as a special course when classes of sufficient size are formed.

VII. CHILDREN'S SATURDAY MORNING CLASS

A class for young girls unable to attend on the other days of the week.

The instruction is especially adapted to girls between twelve and eighteen years of age. The class meets on Saturday morning, at ten o'clock. Each lesson occupies two hours.

VIII. NORMAL COURSE IN DOMESTIC SCIENCE.

A two years' course for the training of teachers of domestic science. The course is fully described on page 121, under NORMAL COURSE IN DOMESTIC SCIENCE.

EQUIPMENT

There are two large school kitchens, the equipment and appointments of which are unsurpassed. Everything necessary for the scientific instruction, as well as for the practical training of the students, is provided.

ADMISSION

Application for admission to any of the courses must be approved by the Director.

Applicants for admission to the Housekeepers Course must have a good general education and be at least twenty-five years of age.

FEES AND TERMS

The fees for the several courses, per term, including all materials, are as follows :—

First Course in General Cookery, *ten dollars.*
Second Course in General Cookery, *fifteen dollars.*
Third Course in General Cookery, *eighteen dollars.*

Invalid Cookery, *ten dollars*. Classes of Nurses from Hospitals and of Medical Students, *six dollars*.

Housekeepers Course, *twenty-five dollars*.

Talks on Food Materials and other matters relating to the Household, *five dollars*.

Course for Waitresses, *three dollars*.

Laundry Work, *three dollars*.

Children's Saturday Morning Class, *eight dollars*.

There are two terms in the year, beginning in October and February, respectively.

For further information apply to Miss Spring, Director.

EVENING CLASSES

In the Evening Classes, instruction is given in the first two courses of General Cookery and in the Course for Waitresses, and is similar to that of the day classes.

The session extends through six months, from the beginning of October to the end of March. In each course, one lesson, of two hours, is given weekly.

Fees for the entire session, which include all the materials used in the instruction: First Course, *five dollars;* Second Course, *six dollars;* Course for Waitresses, *three dollars*.

Full details of these courses will be found on page 171.

NORMAL COURSE IN DOMESTIC SCIENCE

INSTRUCTORS

James Mac Alister, LL. D., President of the Institute.

Helen M. Spring, Director,
Instructor in Household Science and Economics.

Albert P. Brubaker, M. D.,
Professor of Anatomy and Pysiology.

Ernest A. Congdon, Ph. B.,
Professor of Chemistry.

Abraham Henwood,
Instructor in Chemistry.

Catherine J. Coolidge,
Instructor in Bacteriology.

Ellen Morris,
Instructor in Cookery.

Margaret C. Limerick,
Instructor in Cookery.

Harriet E. Gayley,
Instructor in Cookery.

Fannie K. Wardell,
Instructor in Cookery.

Harriet L. Mason,
Chief Instructor in English Language and Literature.

Maude G. Hopkins,
Director of Physical Training.

President Mac Alister lectures on The History and Institutes of Education, during the Senior Year.

The Normal Course in Domestic Science is designed for those who wish to become directors or instructors of this department of educational work in public or private schools, colleges, or hospitals. The course of instruction and training is comprehensive and liberal. The importance of domestic science in its economic and social relations is daily becoming more fully recognized, and the demand for teachers possessing the requisite qualifications is constantly increasing. The instruction is thoroughly scientific and practical, and its bearings upon domestic life are kept in view throughout the course.

The appointments and equipment for the various branches of instruction are unsurpassed. The Chemical and Physical Laboratories are supplied with the newest and most approved forms of apparatus; there are two large School-kitchens furnished with every convenience, and intended to serve as models in all their sanitary arrangements.

The Gymnasium is a large, well-lighted, and well-ventilated hall. The apparatus was designed and constructed under the immediate supervision of Dr. Edward M. Hartwell, formerly Director of Physical Training in the Boston Public Schools. In connection with the gymnasium, there are suites of dressing-rooms, and finely appointed marble baths with hot and cold water.

The Library is supplied with an extensive collection of books and the Reading-room with the best periodicals relating to the subjects taught in the course.

COURSE OF INSTRUCTION

The course occupies two years and embraces the following subjects:—

JUNIOR YEAR

FIRST TERM

1. HOUSEHOLD SCIENCE AND ECONOMICS.—First Course in Theoretical and Practical Cookery. Invalid Cookery. Course for Waitresses. Lectures on special topics.

2. **Chemistry.**—General chemistry—lectures and laboratory work.
3. **Anatomy and Physiology.**—Lectures and demonstrations.
4. **Observation of Teaching** in cookery classes in public schools.
5. **Physical Training.**—Systematic practice in the gymnasium.

Second Term

1. **Household Science and Economics.**—Second Course in Theoretical and Practical Cookery. Invalid Cookery. Combination of dishes for meals. Marketing. Lectures on special topics.
2. **Chemistry.**—General chemistry—lectures and laboratory work. Qualitative analysis.
3. **Anatomy and Physiology.**—Lectures and demonstrations. Lectures on hygiene—personal, domestic, public.
4. **Observation and Practice in Teaching.**—Guild classes and children's classes.
5. **English Language and Literature.**
6. **Physical Training.**—Systematic practice in the gymnasium.

SENIOR YEAR

First Term

1. **Household Science and Economics.**—Third Course in Theoretical and Practical Cookery. Instruction in lunch-room cookery. Laundry Course. Preparation of dietaries.
2. **Chemistry.**—Organic—lectures and laboratory work.
3. **Physiological Chemistry.**—Lectures on relations of food principles.

4. **Observation and Practice in Teaching.**—Guild and other classes.
5. **Physical Training.**—Systematic practice in the gymnasium.

Second Term

1. **Household Science and Economics.**—Advanced Cookery. Instruction in lunch-room cookery. Preparation of dietaries. Laundry Course. Course in Home Nursing.
2. **Chemistry.**—Chemistry of foods and dietetics. Quantitative analysis.
3. **Biology.**—Studies and types of animal life. Animal parasites. Lectures on pathology.
4. **History and Institutes of Education.**
5. **Observation and Practice in Teaching.**—Nurses, waitresses, laundry, and guild, classes.
6. **Physical Training.**—Systematic practice in the gymnasium.

Students attend five days a week.

DIPLOMA

A diploma is given to students who finish the course.

ADMISSION

For admission to the Normal Course in Domestic Science, at least a high-school education or its equivalent is required. The diploma of approved institutions is accepted in lieu of an examination. The number of students that can be received is limited.

FEES AND TERMS

Normal Course, *forty dollars* per term.

A deposit of *five dollars* is required of each student to cover breakage in the Chemical Laboratories. This is returned at the close of the term, less the cost of the apparatus destroyed.

Students supply their own text-books and stationery.

There are two terms in the year, beginning in September and February, respectively. New classes are formed only at the beginning of the year.

SUBJECTS OF INSTRUCTION

Household Science and Economics

1. Lectures on the various subjects related to the economics of the house. These include: classification of food principles; water; salts; carbohydrates; fats; proteids; food adjuncts; baking-powders; fermentation; the preservation of food materials; national and state laws regarding the adulteration of food and the inspection of meat; manufactured food materials; scientific kitchens (public kitchens, school kitchens, and home kitchens); care of the house according to hygienic laws; disposal of waste.

2. Cookery.—The systematic courses extend through both years, and include:—

First Course.—This course includes instruction in the composition and dietetic value of food materials. The lessons are arranged in logical order, and each principle is illustrated by the preparation of simple dishes. The object of the course is the preparation of food in the most digestible and appetizing forms.

Second Course.—This course includes instruction and practice of an advanced character in the preparation of more complicated dishes and menus than are included in the First Course.

Third Course.—This course includes the preparation of still more elaborate and expensive dishes; lessons in marketing and carving; practical demonstration in the cutting of meat.

The instruction in these courses is largely individual, each student preparing an entire dish. They are followed by courses in which larger amounts of material are used, and also by a course in lunch-room cookery, in which the dishes used in the students lunch-room are prepared and a knowledge gained of their nutritive value and cost.

3. **Course for Waitresses.**—The course includes the following subjects in which every well-trained waitress should be expert: Care of dining-room and pantry; care of silver and cutlery; serving of breakfast, luncheon, and dinner; washing dishes; washing and ironing table-linen; removal of stains.

4. **Course in Laundry Work.**—The instruction in laundry work occupies twelve lessons. The exposition of the scientific principles involved in the various processes is followed by actual practice in the laundry. Soaps, washing fluids, bleaching-powders, bluings, and starch are discussed in their scientific and practical relations to laundry work.

Home Nursing.—The furnishing, warming, and ventilating of the sick-room. Bathing, dressing, and administering food and medicine to patients. Practical bandaging, bed-making, lifting and caring for helpless patients. Preparation and application of poultices.

CHEMISTRY

The study of chemistry is begun in the Junior Year with a general course giving a full exposition of the principles of the science and including the study of the most important elements and their chief compounds. There are two lectures a week, and one laboratory period of three hours.

In the Senior Year (First Term) organic chemistry is taken up, one lecture a week being given, with one laboratory period in which the student prepares and studies a typical compound of each class. During the Second Term, a course of lectures in the chemistry of foods and dietetics is given, the lectures being supplemented by laboratory work. The lectures cover the following topics: definitions of foods—chemical composition of food materials and of the human body; proximate food principles—protein, fat, carbohydrate, water, mineral matter; value of foods; use of calories; nutrient ratio; metabolism of foods; diet and dietaries; food materials—water (potable and mineral), common salt, starch foods, sugars, fats and oils, cereals, meats, eggs, fish, fruits, vegetables, salads, beverages, food adjuncts; study of fermentation; preparation of food materials; changes that foods undergo in cooking processes.

The Course in Qualitative Analysis, which is devoted to the study of the common metals and their separations, is given in the Second Term of the Junior Year and the Course in Quantitative Analysis, which deals with Foods and Dietetics, in the Second Term of the Senior Year. Practical laboratory experience with the processes in present use for the analysis of food materials is made the basis of the instruction. The laboratory work is of such a character as to furnish data for the calculation of food values as well as to detect adulterations. The following list indicates the general scope of the quantitative work:

chemically pure salts; potable water; common salt; bicarbonate of sodium; flour or bread; baking-powders; sugar or syrups; milk; butter; lard; cheese; tea; coffee; chocolate.

Printed syllabuses are made the basis of the work in chemistry during the Senior Year.

ANATOMY AND PHYSIOLOGY

During the Junior Year, the course of instruction embraces both lectures and demonstrations. The lectures cover the following topics: the general plan of organization of the animal body; the physical and chemical properties of the tissues; the chemical composition and physiological properties of foods and their relative values as nutritive agents; the general process of digestion; the elaboration of food into blood; the circulation of the blood, respiration, animal heat; secretion and excretion; the physiology of the nervous system and special senses with reference to the lectures on psychology. The laboratory demonstrations have reference to the above course of lectures. Lectures are also given embracing the subjects of physical development, physical training, the effects of diet, the care of the skin, clothing, ventilation, household sanitation, emergencies, and similar hygienic topics.

During the Senior Year, the laboratory work includes the following topics: the chemical relation of starch, sugar, fat, and proteids; the determination of the heat values of food; the process of fermentation; the cultivation of micro-organisms and their relation to disease; dissections of different animal forms generally used as foods. The lectures embrace the following topics: ptomaines and leucomaines of foods and their influence in the production of disease; the parasites usually associated with animal foods; diseases of nutrition, such as gout, diabetes, rickets, scurvy, and rheumatism.

BACTERIOLOGY AND MICRO-ORGANISMS OF FERMENTATION

The subject of bacteriology is dealt with chiefly in its normal and sanitary relations.

The course begins with a brief introduction to general biology.

The Course in Bacteriology includes the examination of air, water, ice, and milk; the principles of sand filtration, and testing of the efficiency of filters; the preparation of culture media and the determination of species; sterilization, disinfectants, and antiseptics. The fermentation organisms studied are those met with in vinegar-making, bread-making, and dairying.

ENGLISH LANGUAGE AND LITERATURE

The course includes the study of prose style in a few representative writers with reference to diction, figures, explicit reference, paragraphing, arrangement of material, description, narration, expression, argumentation. The aim of the course is to develop the ability of the student in logical thinking and in effective expression of thought, both orally and in writing.

HISTORY AND INSTITUTES OF EDUCATION

During the Second Term of the Senior Year, a course of lectures is given by the President of the Institute in the history of theories of education, attention being concentrated upon the progress of education during the past three hundred years. The practical organization and management of school work is also fully discussed, and the special relations of technical and industrial training to general education are carefully elaborated.

In connection with the lectures, meetings for the discussion of the leading topics presented are held, and students are required to prepare papers which form the basis of these discussions.

PHYSICAL TRAINING

Students taking this course must attend the Institute classes in Physical Training twice a week. The close connection between bodily training and the instruction in physiology and hygiene is kept in view throughout the entire course.

COURSES IN DRESSMAKING

INSTRUCTORS

Caroline A. M. Hall, Director,
Instructor in the Theory and Practice of Dressmaking.

Mary L. Sargent,
Instructor in Dressmaking.

Mary E. Eastwood,
Instructor in Dressmaking.

————————
Instructor in Dressmaking.

Hélène Zogbaum,
Instructor in Design in Dressmaking.

Professor Ernest A. Congdon, Ph. B.,
Lecturer on the Chemistry of Textiles, Dyeing, and Cleansing.

Associate Professor John T. Holdsworth,
Lecturer on Business Customs and Accounts.

Maude G. Hopkins,
Director of Physical Training.

COURSES OF INSTRUCTION

The following courses in Dressmaking are offered:—

I. General Course.
II. Technical Course.
III. Course in Sewing.
IV. Normal Course in Domestic Arts.
V. Evening Classes.

I. GENERAL COURSE

The General Course of Instruction consists of four grades, each occupying one term, or half the academic year. Each grade is complete in itself, but the four consecutive grades are essential to thorough training in the practice of the art.

FIRST GRADE

This grade is devoted to the fundamental principles of dressmaking. One plain dress is completed. Two lessons, of two hours each, are given weekly.

SUBJECTS OF INSTRUCTION

I. Implements and appliances used in dressmaking.
II. Cotton staple, its various uses; choice of materials; textiles as to color and application to dress.
III. Taking measurements; drafting foundation skirt; drafting draperies and principles of same; finishing skirt for trimming or draping; making lined skirt.
IV. Form, proportion, and line relating to ornament in dress.
V. Plans for completing skirts; cutting waists with seams from patterns drafted by students of the advanced grades, from measurements taken from different members of the class; basting, fitting; planning trimming; general finish.

SECOND GRADE

In this grade, attention is paid to taking measurements of different figures and to drafting patterns from the same. The first dress made is of plain material; the second is a waist or entire garment of striped or plaid material; the third, a garment on the gown-form. Two lessons, of two hours each, are given weekly.

SUBJECTS OF INSTRUCTION

I. Color and textiles; their various uses and relations to personal adornment; growth of wool and silk; manufacture of fabrics.

II. Taking measurements; drafting plain waist from different measurements; drafting waist with extra seams for large figure; cutting and matching striped, plaid, or figured material for waist—making and trimming the same; drafting and making dresses on the gown-form.

III. Artistic dress in its relations to the body; design in drapery.

IV. Making dress on gown-form from the student's own design.

THIRD GRADE

The work of this grade is chiefly an extension of that of the two preceding grades, with the additional subjects of instruction named below. For further practice, students may receive and execute orders. Two lessons, of two hours each, are given weekly.

SUBJECTS OF INSTRUCTION

I. Advanced drafting. Choice of materials for gowns of special character.

II. Making dinner dress, evening dress; choice of materials for same. Handling of velvet.

III. Making models of inexpensive materials to test the design.

IV. The form and poise of the body in their relation to dress.

V. Child's dress—materials, drafting, cutting, and making the same.

FOURTH GRADE

This grade completes the General Course. It includes instruction in tailor finish, as applied to dresses, jackets, and coats. Orders may be received and executed by students. Two lessons, of two hours each, are given weekly.

SUBJECTS OF INSTRUCTION

I. Material used in making coats, as staple and manufactured.

II. Drafting jackets and coats of various styles; cutting, basting, fitting, pressing; practice in making pockets, applying same to garment; making button-holes, sewing on buttons; lining and finish of coat; making collars.

III. Principles applied to tailor-made dresses.

All materials, except those supplied in the Third and Fourth Grades for ordered work, must be furnished by the students.

All work cut and planned in the classroom must be finished at home.

Each student is required to keep a record of the demonstration lessons in a note-book, and to submit the same for inspection at stated intervals during the term.

In addition to the lessons in dressmaking, instruction is provided in drawing and water-color, for the purpose of giving the students a knowledge of line and form and the ability to execute designs for the various kinds of dresses, coats, etc. The instruction includes outline drawing, light and shade, proportions of the human figure; draperies, dresses, gowns, and coats, in monochrome and color. One lesson, of one and one-half hours, is given weekly.

Instruction is also provided in accounts, business forms, and correspondence, one lesson a week being given throughout the academic year, which begins in September.

A course of lectures in the chemistry of textiles, dyeing, and cleansing is given during the second term of each year. These lectures are made as non-technical as possible, with a view to interesting the students and furnishing them with knowledge that can be made practically available.

II. TECHNICAL COURSE

This course is arranged to meet the needs of those who wish to accomplish, in one year, the work of the General Course and to prepare themselves to become practical dressmakers. It provides additional practice in executing orders, which students may take on their own account during the second half of the year.

Attendance is required every day, except Saturday, from 9 a. m. to 1 p. m. Students have the use of the dressmaking rooms until 4 p. m.

Students receive the full course of instruction in drawing and water-color, and in the keeping of accounts, business forms, and correspondence, given in the General Course.

Students taking this course are expected to attend the courses of lectures in the chemistry of textiles, dyeing, and cleansing and in physiology and hygiene with reference to dress.

The students of this course have the privilege of physical training in the Gymnasium without the payment of an additional fee.

For admission, each applicant must be at least eighteen years of age and have a good knowledge of hand and machine sewing, and must present for inspection a dress made by herself from patterns.

Applicants are admitted to this course only in September of each year, and for the entire course.

CERTIFICATES

Certificates are granted to students who satisfactorily finish all the grades and meet all the requirements of either the General or the Technical Course.

III. COURSE IN HAND AND MACHINE SEWING

The Course in Sewing includes the simple stitches used in hand and machine sewing and their application in the making of garments. Work cut and planned in the classroom must be completed at home. All materials are supplied by the student.

Students who have not had the necessary preliminary training or experience in hand and machine sewing are expected to take this course, in whole or in part, before beginning the dressmaking work.

The complete course occupies two terms. Two lessons of two hours each, are given weekly.

SUBJECTS OF INSTRUCTION

First Grade.—History of implements used in hand sewing; kinds and qualities of materials for undergarments; proper position of the body in sewing; methods of using thread and needles, thimble, and tape-measure; woven textiles; different kinds of stitches; combination of stitches; seams, hems, tucks; button-holes; making simple garments.

Second Grade.—Sewing machines; measurements; drafting drawers, underskirts, and nightgowns; making of garments; cutting and making of corset-covers from patterns; cutting and making of shirt-waist.

IV. NORMAL COURSE IN DOMESTIC ARTS

The Normal Course is intended for those who desire to fit themselves to be teachers of the domestic arts. It includes the full courses in Sewing, Dressmaking, Millinery, and such additional branches as are essential to the teacher's work. Opportunity is afforded for observation and practical training in teaching.

The Normal Course occupies two years. An average attendance of at least four hours daily, except Saturday, is required.

Students who finish the full course of instruction and training and meet all its requirements receive a Normal Diploma.

Full information concerning this course is given on page 145.

EQUIPMENT AND LIBRARY

The dressmaking classrooms are supplied with every appliance and equipment necessary for the instruction.

Constant use is made of the extensive collection of books on costume in the Library and of the collection of textiles belonging to the Museum. The leading American and foreign fashion periodicals are supplied in the dressmaking rooms.

Courses of reading and study in the history of costume are arranged for students desirous of pursuing the same.

ADMISSION

For admission to any of the courses, applicants must be at least eighteen years of age and must be able to do hand and machine sewing. An examination in sewing is held at the beginning of each term.

FEES AND TERMS

GENERAL COURSE

First Grade, *fifteen dollars* per term.

Second Grade, *twenty dollars* per term, including the drafting chart.

Third Grade, *twenty dollars* per term.

Fourth Grade, *twenty dollars* per term.

TECHNICAL COURSE.—*Thirty dollars* per term.

SEWING COURSE.—*Twelve dollars* per term.

NORMAL COURSE.—*Thirty dollars* per term.

There are two terms in the year, beginning in September and February, respectively. In the General Course, students enter for one term at a time.

EVENING CLASSES

In the Evening Classes, instruction is given in the First, Second, and Third Grades of the General Course in Dressmaking. Each grade occupies one session. There is also a class in Sewing.

The session extends through six months, from the beginning of October to the end of March.

In each grade, two lessons, of two hours each, are given weekly.

Full information concerning these classes will be found on page 171.

COURSES IN MILLINERY

INSTRUCTORS

Caroline L. T. Burgess, Director,
Instructor in the Theory and Practice of Millinery.

Emily Grace Swett,
Instructor in Millinery.

Hélène Zogbaum,
Instructor in Design in Millinery.

Associate Professor John T. Holdsworth,
Lecturer on Business Customs and Accounts.

Professor Ernest A. Congdon, Ph. B.,
Lecturer on the Chemistry of Textiles, Dyeing, and Cleansing.

Maude G. Hopkins,
Director of Physical Training.

COURSES OF INSTRUCTION

The following courses in Millinery are offered :—

I. General Course.
II. Technical Course.
III. Normal Course in Domestic Arts.
IV. Evening Classes.

I. GENERAL COURSE

The General Course in Millinery consists of three consecutive grades, each occupying one term. In each grade two lessons in millinery, of two hours each, are given weekly.

This course also includes instruction in drawing and water-color, for the purpose of giving the students a knowledge of line and form, and the ability to execute designs for the various kinds of hats in monochrome and color. One lesson, of one and one-half hours, is given each week, throughout the three grades.

Instruction is also provided in accounts, business forms, and correspondence, one lesson a week being given throughout the academic year, which begins in September.

A course of lectures in the chemistry of textiles, dyeing, and cleansing is given in the second term of each year.

All materials used are selected and furnished by the students.

Constant use is made of the extensive collection of books in the Library and of the important collection of textiles in the Museum. The leading American and foreign fashion periodicals are supplied in the millinery rooms.

FIRST GRADE

In this grade, the work is begun with the study of the hat in detail. The methods of preparing the various fittings for the brim are taught upon a straw and a felt hat, canton-flannel and cheese-cloth being used which represent, respectively, velvet and crape. After each exercise of fitting the brim, the hats are trimmed with suitable bows of sateen which serves as ribbon. The knowledge so gained is then applied in the making of one hat of choice materials.

SUBJECTS OF INSTRUCTION

I. The general principles of harmony of color.
II. Wiring; folds; fitted facing; shirred facing; puffed edge.
III. Bows and rosettes.

IV. Study of line and form as applied to frame-making; buckram hat-frames.
V. Fitted hat made, lined, and trimmed.
VI. Manufactures of straw and felt hats, velvet, and ribbon explained.

SECOND GRADE

In this grade, the bonnet and toque are studied, using for practice materials that are appropriate for the same. The latter part of the grade work is devoted to the making of bonnets and toques of choice materials.

SUBJECTS OF INSTRUCTION

I. Color and materials as related to the head-dress.
II. Bonnet with plain crown and with puffing, made, lined, and trimmed.
III. Bonnet of more complex design.
IV. Toque made, lined, and trimmed.
V. Practical work, regulated by the season in which the grade is studied, and leading to a knowledge of the designing of bonnets and hats. At least four pieces of millinery must be made by each student.

THIRD GRADE

Throughout this grade students work in choice materials, to gain confidence and experience; they are allowed to receive and execute orders.

SUBJECTS OF INSTRUCTION

I. Crape bonnet.
II. Silk bonnet or hat.
III. Growth and manufacture of silk explained.
IV. Wire frame-making.
V. Large velvet hat.
VI. Evening bonnet from student's own design.
VII. Shirred hat.

GRADUATE WORK

Students who have finished the three grades of the General Course may remain another term for the purpose of doing more original work and gaining additional practice in dealing with the designs and materials appropriate to the two millinery seasons. The work may consist largely of orders taken by the student.

II. TECHNICAL COURSE

The Technical Course is designed to train students to become practical milliners. It occupies one year.

Attendance is required every day in the week, Saturday excepted.

Applicants are admitted only in September of each year, and for the entire course.

Students of the Technical Course have the privilege of physical training in the Gymnasium, twice a week, without the payment of an additional fee.

A certificate is granted to students who satisfactorily complete the Technical Course and pass all the required examinations.

III. NORMAL COURSE IN DOMESTIC ARTS

The Normal Course is intended for those who desire to fit themselves to be teachers of the domestic arts, including sewing, millinery, and dressmaking.

Besides all the studies of the General Courses in Millinery and Dressmaking, the Normal Course includes such additional branches as are essential to the teacher's work. Opportunity is afforded for practical training in teaching, in connection with the Evening Classes of the Institute.

The Normal Course occupies two years. An average attendance of at least four hours daily, except Saturday, is required.

Students who finish the full course of instruction and training and meet all its requirements receive a Normal Diploma.

Full information concerning this course is given on page 145.

ADMISSION

For admission to any of the courses, students must be at least eighteen years of age and must have a good knowledge of hand sewing. For admission to the Technical Course, applicants are required to present for inspection a piece of millinery, the work upon which must have been executed in the classroom of the Institute.

FEES AND TERMS

General Course, *twelve dollars* per term.
Technical Course, *thirty dollars* per term.
Normal Course, *thirty dollars* per term.

There are two terms in the year, beginning in September and February, respectively.

EVENING CLASSES

In the Evening Classes, instruction is given in the first and second grades of the General Course. The session extends through six months, from the beginning of October to the end of March. Two lessons, of two hours each, are given weekly. The fees for the session are *three dollars* for the first grade and *five dollars* for the second grade. Full details will be found on page 171.

NORMAL COURSES FOR THE TRAINING OF SPECIAL TEACHERS.

FACULTY

James MacAlister, LL. D., President of the Institute.

Lieut. William L. Bailie, U. S. N.,
Director Department of Mechanic Arts.

Parke Schoch, A. M.,
Director Department of Commerce and Finance.

Helen M. Spring,
Director Courses in Domestic Science.

Caroline A. M. Hall,
Director Courses in Dressmaking.

Caroline L. T. Burgess,
Director Courses in Millinery.

The rapid growth and introduction of manual training and other forms of industrial education into schools of almost every grade, have given rise to a demand for thoroughly trained teachers in these new lines of special work. To meet this demand, the Institute has undertaken to provide courses of instruction for men and women, with a view to qualifying them for those grades of teaching in which artistic, scientific, and practical studies are harmoniously conjoined. It is important that high standards should be established for this department of teaching, and in arranging the following courses, the effort has been to make the training liberal as well as practical. The large resources of the Institute, both as to teaching and the appliances necessary for this kind of work, enable it to offer superior facilities in this direction.

The actual exemplification of the methods of manual and industrial training in the several departments of the Institute, constitutes in itself a valuable means of pedagogical study by means of observation; while the extensive artistic, scientific, technical, and mechanical collections and apparatus serve to familiarize the normal students with their practical use in the work of instruction.

The Normal Courses are under the immediate direction of the President of the Institute, who lectures on the correlation of the various lines of instruction and training given in the courses, as well as on the general principles of the history of education and the special history of industrial schools and methods.

The following courses are offered:—

I. NORMAL COURSE IN MANUAL TRAINING.
II. NORMAL COURSE IN DOMESTIC SCIENCE.
III. NORMAL COURSE IN DOMESTIC ARTS.
IV. COMMERCIAL COURSE FOR TEACHERS.

The second and third courses consist largely of specialized training with a view to preparing teachers for advanced work in domestic science and domestic arts, as well as teachers fitted to give the training in cookery, sewing, dressmaking, and millinery which is gradually finding its way into public and private schools, as an element in the general education of girls.

I. NORMAL COURSE IN MANUAL TRAINING

JUNIOR YEAR

FIRST TERM

Free-hand drawing; mechanical drawing; modeling in clay. Shop-work: woodwork—elementary exercises and joinery; ironwork—chipping and filing. Mathematics. English language and literature.

SECOND TERM

Still-life drawing; mechanical drawing; descriptive geometry; clay modeling. Shop-work: woodwork—joinery; ironwork—bench-work. Mathematics. English language and literature.

SENIOR YEAR

FIRST TERM

Cast drawing from architectural ornament; mechanical drawing; principles of design—historic ornament; linear perspective—lectures and problems; wood-carving. Shop-work: woodwork—turning and pattern-making; ironwork—forging. Physiology and hygiene.

SECOND TERM

Mechanical drawing; lectures on the architectural styles; wood-carving. Shop-work: woodwork—pattern-making and execution of original projects. Metal-work; forging; molding; founding. Theory and practice of the steam-engine; the structure and uses of machine tools used in machine work. History and institutes of education.

Each student is required to design and complete at least one project in wood and one in iron during the Senior Year.

II. NORMAL COURSE IN DOMESTIC SCIENCE

The course of instruction and the outlines of the several subjects included in it are fully set forth on page 121.

III. NORMAL COURSE IN DOMESTIC ARTS.

This course is designed for the training of teachers of domestic arts in public, industrial, and normal schools.

The course occupies two years. The instruction and training follow closely the first three grades of the General Courses in Dressmaking and Millinery, which are fully described on pages 130 and 137, with the addition of such branches as are necessary to give the teacher a thorough and comprehensive knowledge of dress in its relations to the individual and to society.

The additional instruction includes the history and institutes of education and observation and practice in teaching.

IV. COMMERCIAL COURSE FOR TEACHERS

The course is completed in one year. It is intended to prepare young men and young women for positions as commercial teachers. There is an increasing demand for teachers who are thoroughly trained in this special department of educational work, and who, at the same time, have the broad intelligence and general culture which are necessary to success. The scope and character of the instruction are described on page 100.

It is not essential that the applicant should have a knowledge of bookkeeping. The important qualifications are: (1) ability to do the work of the course; (2) adaptability for this special department of the teacher's profession.

ELECTIVE COURSES

Elective Courses can be arranged for those not desiring to pursue the full course.

PHYSICAL TRAINING

The students of the Normal Courses have the privilege of attending the Institute classes in physical training without additional charge.

DIPLOMA

A diploma is granted to students who complete any of the above courses and pass all the required examinations.

ADMISSION

For admission to any of the Normal Courses, applicants must either give evidence of a good general education, embracing English language and literature, elementary mathematics, and general history, or pass an examination in the same. Applicants are preferred who have had at least two years' experience in teaching.

FEES AND TERMS

Normal Course in Manual Training, *forty dollars* per term.

Normal Course in Domestic Science, *forty dollars* per term.

Normal Course in Domestic Arts, *thirty dollars* per term.

Commercial Course for Teachers, *thirty dollars* per term.

Students are required to attend five days a week, and not less than five hours each day.

There are two terms in the year, beginning in September and February, respectively.

In the Manual Training Course, a deposit of *five dollars* is required of each student, as security against breakage in the Mechanical Laboratory. This is returned at the close of the term, less the cost of the apparatus injured.

In the Domestic Science Course, each student is required to make a deposit of *five dollars* to cover breakage in the Chemical Laboratories. This is returned at the close of the term, less the cost of the apparatus destroyed.

In the Commercial Course for Teachers, a deposit of *fifty cents* is required of each student, as security for the return of the desk key.

Each student taking physical training is required to make a deposit of *fifty cents*, as security for the return of the locker key in the gymnasium.

Men students are charged *fifty cents* per term for the use of a coat-locker, with individual combination lock, which gives each student the absolute control of his own property.

A storage-room for bicycles, in the basement, is provided by the Institute, free of charge. An individual check for each bicycle is given by the attendant.

LIBRARY SCHOOL

INSTRUCTORS

Alice B. Kroeger, Librarian and Director of the Library School,
Instructor in Cataloguing, Library Economy, and Reference Work.

Sarah W. Cattell,
Assistant Librarian and Instructor in Library Economy and Literature.

————————,
Instructor in Library Economy.

Adèle M. Smith,
Instructor in Proof-reading.

Carl Lewis Altmaier,
Instructor in Typewriting and Correspondence.

James MacAlister, LL. D., President of the Institute, lectures on The History of Books and Printing.

The Library School was organized in connection with the Library Department of the Institute in November, 1892, in order to furnish opportunities for the systematic training of librarians and assistants. The function of the library as an important part of the educational system of the country has become generally recognized. In consequence, the librarian's occupation is now considered a profession, and a special preparation for it a necessity. Graduates of training schools are able to advance more rapidly and to do their work with more satisfaction to themselves, as well as to others, because they have a systematic knowledge of the principles underlying the librarian's work.

The School offers a one year's course in library science. As the instruction is largely technical, a good general education on the part of the students is pre-supposed, a high-school education or its equivalent being a necessity. The broad educational side of the profession is also emphasized, while the literary part of the course is designed to assist the students in gaining the librarian's technical knowledge of books and authors, which can only be acquired by library methods. Graduates of the school are filling positions as librarians, cataloguers, or general assistants, in large as well as small libraries, in public, university, and school libraries.

Certificates are granted only to students who complete, satisfactorily, the full course of instruction.

COURSE OF INSTRUCTION

I. Cataloguing

The instruction in cataloguing is based on the rules of the American Library Association. "The Library School Rules" is used as a text-book. Dictionary cataloguing is taught in accordance with Cutter's "Rules for a Dictionary Catalogue." The instruction is supplemented by practical cataloguing under supervision. The preparation of finding lists and reference lists is also considered.

II. Library Economy

Includes the following subjects: Library handwriting, accession and order work, classification, shelf-listing, alphabeting, mechanical preparation of books for the shelves, shelf-arrangement, care of periodicals and pamphlets, bookbinding, charging-systems, stock-taking, supplies, statistics, proof-reading, typewriting.

Order Department.—Lectures on trade bibliography, on the selecting of books and various processes and methods of ordering them, with practical exercises in selecting and ordering.

ACCESSION DEPARTMENT.—The Library School accession book rules are used as the basis of the instruction, with practical work in accessioning books.

CLASSIFICATION.—The Decimal classification is taught. Books are assigned for classification and discussed in class. Practical work for the library, under supervision. The Expansive and other systems of classification are described.

SHELF DEPARTMENT.—Shelf-listing by both methods (cards and sheets). Lectures on shelf-arrangement, stock-taking, and other details.

CIRCULATING DEPARTMENT.—Lectures on comparative methods of charging. Practical work at the charging-desk of the Institute Library is required of each student. Lectures on access to shelves, information desks, rules and regulations.

BINDING, REBINDING, AND REPAIRING.—The most approved styles of library binding, the processes of binding, and directions for preparing books for the bindery. A visit to a bindery is made at the conclusion of the lectures. A brief outline of the history of bookbinding is also given.

III. STUDIES OF ENGLISH AND AMERICAN AUTHORS

A practical course comprising the English and American authors of the nineteenth century, with special attention to the bibliography of each author, as well as of the whole period. No text-book is used, an important feature of the course being the constant reference work required of each student in the use of the resources of the Library on the subject.

IV. REFERENCE WORK AND BIBLIOGRAPHY

This subject includes the study of general encyclopedias, dictionaries, atlases, cyclopedias of special subjects, indexes and keys to periodicals and general literature, concordances, public documents, books and reading, general bibliography and bibliographies of special subjects. Practical questions are given to the students to be looked up in the reference books, with the object of showing how to obtain information on a subject quickly. Lectures are also given by some of the professors of the Institute on the literature of their specialties.

V. LIBRARY HISTORY AND EXTENSION

History of libraries, library associations and commissions, library buildings, library schools, traveling libraries, children's reading, and home libraries.

VI. PRACTICAL WORK

In addition to the instruction and lectures, students are required to devote a certain amount of time to practical work, under supervision, in the Library of the Institute.

During the year, visits are made to the public libraries in Philadelphia and to the more important libraries in New York, or elsewhere.

Each student, during the second term, prepares a bibliography or reference list on some subject approved by the Director.

VII. LECTURES

LECTURES ON THE HISTORY OF BOOKS AND PRINTING

A course of lectures by the President of the Institute, giving a comprehensive outline of the History of Books and Libraries, and the Rise and Development of Printing. The lectures embrace the following subjects:—

I. The Development of Language, Oral and Written. Ancient Systems of Writing. Derivation of the English Alphabet. The Preservation of Literature. Earliest Forms of Permanent Records. Literature, Books, and Libraries in the Ancient Civilizations of the East.

II. The Literatures of Greece and Rome. The Book in the Classical Age. Alexandria as a Literary Center. Barbarian Invasions of the Roman Empire. Decline and Extinction of Ancient Culture. Destruction of Books and Libraries.

III. The Book in the Middle Age. The Preservation and the Production of Books in the Monasteries. Development of the Illuminated Manuscript. The Early Renascence in its relations to Literature and Books.

IV. The Later Renascence; Revival of Learning. Recovery of Ancient Literature. Rome, Florence, and Venice as the Centers of Activity. Multiplication of Manuscripts. The Formation of Modern Libraries.

V. The Art of Engraving as the Precursor of Printing. The Invention and Diffusion of Printing. The Chief Centers and the Great Masters of Printing. The Printed Book and Its Influence upon Civilization.

VI. Book Illustration in Ancient, Medieval, and Modern Times.

VII. Books and Libraries in Europe and the United States. Types of Modern Public Libraries.

VIII. Makers and Lovers of Books, and their Libraries.

LIBRARY AND READING-ROOM

The Library contains twenty-four thousand volumes and the Reading-room is supplied with one hundred and eighty periodicals.

Among the special collections of the Library are: the George W. Childs Collection of Manuscripts, presented by him to the Institute; the Charles H. Jarvis Memorial Library of Music; the George M. Standish Collection of general literature, including early printed books, illustrated books, fine editions of Italian and French writers, English books in art, literature, history, etc.; and the valuable and important works on art presented by Mr. James W. Paul, jr., and others.

ADMISSION

The entrance examination is held in September (about the twentieth). The subjects include: (*a*) general literature; (*b*) history and general information. As the number of students that can be admitted is limited to twenty, selection is made from those presenting the best examination papers, and showing special fitness for the course. No examination in foreign languages is given, but a knowledge of any (especially French and German) counts in favor of the candidate.

In the case of students unable to attend the examination held in Philadelphia, arrangements can be made for local examinations in places where there is a public or college library, provided the librarian is willing to undertake the conduct of the same. Notice must be given to the Director of the School in time to arrange for the local examinations.

In preparing for the entrance examinations, it is recommended that the applicant should give most attention to the study of literary history and criticism, and general history. Any good outline of these subjects will do as a basis for review. Vertical handwriting is used in most library records. It is therefore of great advantage to the student to have some proficiency in it before entering the school.

Sample entrance examination questions will be sent on application to the Director.

FEES

Full Course, *twenty dollars* per term.

Reference Work (when taken separately) *three dollars.*

Students supply their own stationery and other materials, the cost of which is from fifteen to twenty dollars for the year.

TERMS

The full course extends from the first of October until the end of the calendar year, about the middle of June. Applicants are not admitted to the regular course except at the beginning of the calendar year, in October.

There are two terms in the year, beginning in October and February, respectively.

Attendance is required five days a week, from 9 a. m. to 4 p. m.

DEPARTMENT OF PHYSICAL TRAINING.

MAUDE G. HOPKINS,
J. PETERSON RYDER, S. B., } Directors.

The Department of Physical Training has been organized for the purpose of furnishing thorough and systematic physical education. The training begins with simple exercises and gradually leads to more complex movements, the aim throughout being the harmonious development of the bodily powers in their relation to sound mental action. The methods of training are founded on physiological and hygienic principles, and are in accordance with the teachings of the highest authorities on physical education. From first to last, the object kept in view is the cultivation of a healthy physique rather than gymnastic feats.

The Gymnasium is a large, well-lighted, and well-ventilated hall, and is unsurpassed in the completeness of its appointments. The apparatus was designed and constructed under the immediate direction of Dr. Edward M. Hartwell, formerly Director of Physical Training in the Boston Public Schools. In connection with the Gymnasium there are dressing-rooms and separate suites of finely-appointed marble baths, with hot and cold water, for men and women.

SPECIAL CLASSES

The Gymnasium is primarily intended for the physical training of the students connected with the several departments of the Institute, but special classes are conducted as follows:—

SPECIAL CLASSES FOR LADIES

MORNING CLASS.—Two days per week, at ten o'clock.
AFTERNOON CLASS.—Two days per week, at three o'clock.

CHILDREN'S CLASSES

There are also Special Classes for Children :—
Two days per week, at 4.15 p. m.

The Directors exercise immediate supervision over all the class work and the use of the baths.

The members of all the classes are required to provide themselves with a suitable gymnastic dress.

TERMS

The arrangements for the terms are as follows :—

1. INSTITUTE CLASSES begin as soon as practicable after the opening of the academic year in September and continue until the close of the year.

2. SPECIAL CLASSES FOR LADIES, one term of six months, begin November 1 and continue until May 1.

3. SPECIAL CLASSES FOR CHILDREN, one term of six months, begin November 1 and continue until May 1.

4. SPECIAL STUDENTS (ladies) desirous of devoting more time to the training may attend for two terms of four months each, the first term beginning October 1 and the second term February 1.

FEES

SPECIAL CLASSES FOR LADIES, one term of six months, *fifteen dollars ;* two terms, of four months each, *ten dollars* per term.

Children's Classes, one term of six months, *fifteen dollars.*

A deposit of *fifty cents* per term is required as security for the return of the locker key.

LECTURES ON ANATOMY AND PHYSIOLOGY

The lectures on Anatomy and Physiology which are given in the Department of Domestic Science, by Dr. A. P. Brubaker, are open to special students and to such other persons as may desire to attend them. These lectures are of special value in themselves, aside from their bearing upon physical well-being.

The course of instruction embraces both lectures and demonstrations. The lectures cover the following topics: the general plan of organization of the animal body; the physical and chemical properties of the tissues; the chemical composition and physiological properties of foods and their relative values as nutritive agents; the general process of digestion; the elaboration of food into blood; the circulation of the blood, respiration, animal heat; secretion and excretion; the physiology of the nervous system and special senses with reference to the lectures on psychology. The laboratory demonstrations have reference to the above course of lectures. Lectures are are also given embracing the subjects of physical development, physical training, the effects of diet, the care of the skin, clothing, ventilation, household sanitation, emergencies, and similar hygienic topics.

During the Senior Year, the laboratory work includes the following topics: the chemical relation of starch, sugar, fat, and proteids; the determination of the heat values of food; the process of fermentation; the cultivation of micro-organisms and their relation to disease; dissections of different animal forms generally used as foods. The lectures embrace the following topics: ptomaines and leucomaines of foods and their influence in the production of disease; the parasites usually associated with animal foods; diseases of nutrition, such as gout, diabetes, rickets, scurvy, and rheumatism.

An additional fee of *ten dollars* per term is charged for the first course, and of *five dollars* per term for the second course.

EVENING CLASSES

Separate Evening Classes for young men and young women are provided during the winter months. The fee for each class is *three dollars* for the session of six months. Full information concerning these classes is given on page 173.

DEPARTMENT OF EVENING CLASSES.

The Evening Classes are intended to bring the opportunities offered by the Institute within the reach of those who are unable to attend during the day. The range of instruction and training is wide, embracing nearly all the courses belonging to the several departments, with the addition of choral music. The instruction is given by the regular staff of teachers, supplemented by able specialists engaged in their respective professions. In fact, all the resources of the Institute, in the way of teaching, laboratories, and appliances of every kind, are brought to bear upon the Evening Classes, and a liberal share of the endowment is appropriated to maintaining the work at the highest possible standard.

The session is for six months, beginning October 1 and continuing until the first of April.

ART COURSES

I. FREE-HAND DRAWING.—Monday and Wednesday. MARY E. FRATZ, Instructor. Fee, *three dollars.*

II. DRAWING FROM THE ANTIQUE.—Tuesday and Thursday. JAMES L. WOOD, Instructor. Fee, *three dollars.*

III. CLAY MODELING: ELEMENTARY AND LIFE CLASSES.—Monday and Wednesday. JOHN TODD HILL, Instructor. Fee, *three dollars.*

IV. Life Class.—For men, Tuesday, Thursday, and Friday; for women, Monday and Wednesday; from 7 to 10 p. m. James L. Wood, Instructor. Fee, *six dollars.*

ARCHITECTURAL COURSES

I. Course in Architectural Drawing.
II. Course in Architectural Design.
III. Course in Building Construction.
IV. Course in House Construction.
V. Course in Pen and Ink Rendering.
VI. Course in Water-Color Rendering.

These courses are intended primarily for the training of special expert architectural assistants, and are arranged with that end in view, each class being in charge of a professor or instructor especially adapted to the work and actively engaged in daily professional practice.

I. Course in Architectural Drawing. Professor John J. Dull, in charge. Herman L. Duhring, Instructor. Tuesday and Thursday evenings, at 7.30.

The full course, leading to a graduate certificate, occupies two sessions (years). The work is divided as follows:—

First Year.—The mechanical projection of shades and shadows, and the theory of light and shade work with the making of wash drawings in monotone for practice work; followed by lectures on perspective, and the making of practical architectural perspective drawings from plans and elevations.

Second Year.—The classic orders: their principles and proportions, and the theory and uses of their various moldings and parts; the making of wash drawings in monotone of the same, with cast shadows for practice; followed by lectures on the development of the architectural styles, and the drawing of the distinctive ornamental work of the said styles.

Examinations are held in the middle and at the end of each session, to determine the standing and progress of the students.

Requirements for Admission.—A knowledge of mechanical drawing sufficient for the general understanding of sections and projections. Applicants must submit drawings which are of sufficient merit to satisfy the professor in charge that they can profit by the instruction.

Fees.—First year, *four dollars;* second year, *five dollars.*

II. COURSE IN ARCHITECTURAL DESIGN. PROFESSOR JOHN J. DULL, in charge. Tuesday and Thursday evenings, at 7.30.

The work of this course consists of a series of problems in design, with a critical review of the work at the completion of each problem.

Requirements for Admission.—Applicants who have obtained the certificate of the Class in Architectural Drawing are admitted without further examination. Other applicants are received on the approval of the professor in charge.

Fee, *five dollars.*

III. COURSE IN BUILDING CONSTRUCTION. PROFESSOR HOWARD S. RICHARDS, B. S., in charge.

This course offers to persons engaged during the day opportunity for the theoretical and practical study of the architectural and engineering problems involved in building construction, similar to that of the regular day classes, the only difference being the length of time which can be devoted to the work. All the resources of the department are brought into requisition, and the instruction is carried as far as the attainments and application of the students warrant.

The full course, leading to a graduate certificate, occupies two sessions, of six months each, but students are admitted for a single session to either of the classes for which they have the necessary preparation.

The preparation in mathematics and mechanical drawing required for admission to the course is furnished by the evening classes in these subjects.

The course is arranged as follows :—

First-Year Class.—Wednesday evening, at 7.30. Lectures on the strength of building materials, investigation and calculation of the strength of tension members, compression members, beams, plate-girders, foundations, etc. Graphic analysis of the stresses in the ordinary forms of roof-trusses. Calculation of the weights of materials and of the usual loads upon floors, roofs, etc.

Second-Year Class.—Saturday afternoon, 2 to 5. Lectures on the design of structural parts and the best and most economical forms of construction. Advanced calculations. Design and detail of complete constructions. Specifications.

Drawing and Testing Class.—Monday evening, at 7.30. For both the First-year and the Second-year Class. Drawing of details of foundations, columns, roof-trusses, joints in wood and steel construction, timber work, riveted steel work, pin-connected work, and all kinds of structural detail. Testing of strength of stone, brick, and cement; also tension, compression, and transverse tests of steel and timber, and of the various combinations used in building construction.

Equipment.—The Institute is equipped with all appliances for making these tests in the latest and most approved manner, including a 200,000-pound Olsen Automatic and Autographic Machine and a Standard Cement Tester.

Certificate.—In order to obtain a graduate certificate, a student must complete the full course of two years and must prepare, as a thesis, the design and detail of a satisfactory piece of construction.

Requirements for Admission.—For admission to the First-year Class, a knowledge of Elementary Mathematics (Algebra and Plane Geometry) and Mechanical Drawing is required; to the Second-year Class, a knowledge of the subjects embraced in the First-year Class.

Fees.—Elementary Class, *five dollars;* Advanced Class, *six dollars.*

IV. COURSE IN HOUSE CONSTRUCTION. PROFESSOR JOHN J. DULL, in charge. HERMAN L. DUHRING, Instructor. Tuesday and Thursday evenings, at 7.30.

The full course, leading to a graduate certificate, occupies two sessions (years).

First Year.—The drawing of plans and elevations and various woodworking details.

Second Year.—Continuation of the work in detail drawing and the study of specifications.

Lectures on plumbing, heating, and lighting are given in connection with the work on specifications.

Examinations are held in the middle and at the end of each session.

Requirements for Admission.—Same as for Architectural Drawing Class.

Fees.—First year, *four dollars;* second year, *five dollars.*

V. COURSE IN PEN AND INK RENDERING. PROFESSOR ARTHUR TRUSCOTT, Instructor. Friday evenings, at 7.30.

The full course, leading to a certificate, occupies one session.

The work in this class is devoted primarily to architectural subjects, the rendering of buildings and accessories. Attention at the same time is given to all classes of illustrative work, so that students may, if they so desire, pursue a course in broader fields of illustration.

Requirements for Admission.—A sufficient knowledge of drawing to satisfy the professor in charge that the student can profit by the instruction. Drawings must be submitted.

Fee.—*Four dollars* per session.

VI. COURSE IN WATER-COLOR RENDERING. PROFESSOR JOHN J. DULL, Instructor. Saturday, at 2.30 p. m.

If found more convenient, the class will meet on some evening, other than Saturday, at 7.30.

The full course, leading to a certificate, occupies one session.

The Water-Color Class aims to furnish the architectural draftsman with one of the most valuable qualifications for architectural work—the effective, strong, and rapid rendering in color of perspectives and architectural subjects.

Requirements for Admission.—The same as for the Course in Pen and Ink Rendering.

Fee.—Five dollars per session.

In all the Architectural Courses the number of students is limited to twenty for each division or class.

Equipment.—The Institute is thoroughly equipped with the appliances necessary for carrying on the work, including a collection of architectural casts, models of interior construction and finish, etc., etc.

Of the special drawing equipment necessary to each student, the Institute furnishes drawing-boards, angles, and in the House Construction Classes, scales. Students supply themselves with drawing instruments, paper, etc. In connection with the Institute, there is a supply-store, where these articles can be obtained. Lockers are provided for instruments, etc.

Library and Reading-Room.—The Library contains an extensive collection of valuable and important books on architecture. There is also an extensive collection of architectural photographs, to which additions are constantly made.

The Reading-room is supplied with the leading architectural periodicals.

A Special Reference Library and Reading-room, communicating with the classrooms, is provided for the use of the Architectural Classes.

WOOD-CARVING

Ornament of various kinds; carved enrichments for furniture; frames; architectural decorations, etc. Tuesday and Thursday. JOHN TODD HILL, Instructor. Fee, *three dollars.*

SCIENCE COURSES

MATHEMATICS

I. BEGINNERS COURSE IN ALGEBRA AND GEOMETRY.—Tuesday and Thursday. Fee, *three dollars.* A knowledge of arithmetic is required for admission to this class.

II. ADVANCED ALGEBRA AND GEOMETRY.—Monday and Wednesday. Fee, *three dollars.*

III. PLANE TRIGONOMETRY.—Wednesday. Fee, *three dollars.*

IV. ANALYTICAL GEOMETRY.—Thursday. Fee, *three dollars.*

V. CALCULUS.—Tuesday. Fee, *three dollars.*

PROFESSOR CHARLES H. WHEELER and KATHARINE F. DILL, B. S., Instructors.

MECHANICAL DRAWING

Orthographic projection; intersections; developments and their applications to machine construction, etc. Monday and Wednesday; Tuesday and Thursday. Fee, *three dollars.*

Professor John F. Rowland, Jr., B. S., M. E., in charge; **Bernhardt Haug**, **George W. Irons**, **William Leseur Haynes**, Instructors.

CHEMISTRY

I. **General Chemistry.**—Lectures and laboratory work. Tuesday and Wednesday. **Professor Ernest A. Congdon**, Ph. B.; **Frederick L. Lewton**, Instructor. Fee, *five dollars*.

II. **Elements of Qualitative Analysis.**—Laboratory work. Tuesday and Wednesday. **Professor Ernest A. Congdon**, Ph. B.; **Frederick L. Lewton**, Instructor. Fee, *five dollars*.

III. **Elements of Quantitative Analysis.**—Laboratory work. Tuesday and Wednesday. **Abraham Henwood**, Instructor. Fee, *five dollars*.

IV. **Advanced Quantitative Analysis.**—Laboratory work. Tuesday and Wednesday. **Abraham Henwood**, Instructor. Fee, *five dollars*.

V. **Technical Analysis.**—Tuesday and Wednesday. **Abraham Henwood**, Instructor. Fee, *five dollars*.

This course is designed for advanced students who desire to fit themselves for dealing with the practical problems of engineering chemistry. The course embraces the following subjects:—

Fuel.—Proximate analysis of coal; moisture, volatile matter, coke, ash, and sulphur. Specific gravity and calorific value.

Gas.—Determinations of carbon di-oxide, oxygen, carbon monoxide, hydrogen and nitrogen, employing the Elliot, Fisher-Orsat, and Hempel forms of apparatus.

Water.—Total solid matter, temporary and permanent hardness, chlorides, sulphates, nitrates, also silica, iron oxide, alumina, lime, magnesia, potash, and soda.

Lubricating Oil.—Specific gravity, viscosity, cold test, flashing point, loss in weight on exposure to elevated temperatures, tendency to oxidize and gum, percentage of mineral and of fatty oil, free fatty acid, free mineral acid, suspended matters, rosin oil.

A deposit of *three dollars*, as security against breakage, is required of students in the chemistry classes. This is returned at the close of the session, less the cost of the apparatus destroyed.

PHYSICS

I. LABORATORY COURSE. — Tuesday and Thursday. PROFESSOR WILLIAM J. HOPKINS, S. B. Fee, *five dollars.*

II. SPECIAL COURSE FOR ADVANCED STUDENTS. Lectures and laboratory work. Tuesday and Thursday. PROFESSOR WILLIAM J. HOPKINS, S. B. Fee, *five dollars.*

A deposit of *three dollars*, as security against breakage of apparatus, is required of students in physics. This is returned at the close of the session, less the cost of the apparatus injured.

APPLIED ELECTRICITY

EVENING CLASSES IN APPLIED ELECTRICITY are provided for those unable to avail themselves of the day classes. The instruction and training are of the most practical character. In the Second Course, such scientific and technical work is taken up as can be accomplished with the amount of mathematical knowledge required for admission.

There are two courses, as follows:—

First Course.—A course of one year, embracing the Simple Theory of the Electric Circuit and its commercial application in lighting and power distribution, etc., with laboratory work in testing. Classroom work, Thursday; laboratory work, Tuesday or Friday. Fee, *five dollars*.

This course is intended for men who have not the time to devote to the study of physics and mathematics, and is designed to prepare them for operating electric plants.

An examination in Arithmetic and the simpler Algebraic Forms must be passed for admission to this course.

Second Course.—A systematic course of two years, embracing lectures on the Theory and Practical Application of Continuous and Alternating Currents. The electrical measurements and tests used in general engineering work are made in the laboratories. First-year Class, Tuesday and Thursday; Second-year Class, Tuesday and Friday. Fee, *six dollars*.

For students not having the knowledge of mathematics, physics, and chemistry necessary for taking up the Second Course, there is a regular preparatory course in these branches.

Students not having a knowledge of plane trigonometry must attend the class in that subject during the first year, as a part of the preparation for the second year's work.

The Second Course is intended for those who have had some scientific training and are engaged in, or desirous of, preparing themselves for the higher grades of electrical work.

The practical work of the students is carried on in the

Electrical Laboratories which are equipped with an extensive plant of engines, dynamos, testing apparatus, etc.

For admission, applicants must have a knowledge of Laboratory Physics, Elementary Algebra, and Plane Geometry.

Students entering either the First or the Second Course are required to make a deposit of *five dollars* as security against injury to apparatus. This is returned at the close of the session, less the cost of the apparatus injured or destroyed.

PROFESSOR ARTHUR J. ROWLAND. WILLIAM B. CREAGMILE, BERTRAND JOHNSON, Instructors.

COMMERCIAL COURSES

I. COURSE IN BOOKKEEPING, COMMERCIAL ARITHMETIC, AND PENMANSHIP.—This course extends over three years. No examination is required for entrance to the first year's work. To the second- or third-year class, candidates are admitted, who can show by examination that they are qualified to take up advanced work. This course includes also instruction in business forms and customs. Two sections attend Monday and Thursday evenings, a third section attends Tuesday and Thursday evenings. The special evenings for each particular section are determined on the organization of the classes. A special circular can be had, giving full details of the course of study.

II. OFFICE COURSE IN STENOGRAPHY AND TYPEWRITING.—This course is complete in three years. Candidates are admitted to the advanced classes who can show evidence of ability to enter upon the second or third year's work.

This course includes a thorough training in stenography and typewriting for office work. The first-year class attends Monday and Thursday evenings, the second- and third-year classes, Tuesday and Friday evenings. A special circular can be had giving full details of the course of study.

The Certificate of the Department of Evening Classes is granted to students who complete either of the foregoing courses and pass a satisfactory examination in ordinary English composition.

Fee.—The fee for each of the above courses, for the entire session, is *five dollars*, payable in advance.

Text-Books.—Students are required to supply their own text-books.

PROFESSOR PARKE SCHOCH, A. M., Director. PROFESSORS JONATHAN J. SPARLING, CARL LEWIS ALTMAIER, JOHN T. HOLDSWORTH. CAROLYN H. LOCKE, Instructor.

A special circular, giving fuller information concerning the Commercial Courses can be had on application to the Registrar.

SHOP-WORK COURSES

I. WOODWORKING.—Thursday. R. WILLETTE CLINGER, Instructor. Fee, *three dollars.*

II. BENCH-WORK IN IRON.—Tuesday and Thursday. CLEMENT E. MOSSOP, Instructor. Fee, *three dollars.*

III. FORGING.—Tuesday and Thursday. THOMAS MCCREIGHT, Instructor. Fee, *three dollars.*

IV. MACHINE CONSTRUCTION.—Tuesday and Thursday. CLEMENT E. MOSSOP, Instructor. Fee, *five dollars.*

A deposit of *three dollars*, as security against breakage of tools, is required of students in the Machine Construction Class. This is returned at the close of the session, less the cost of the tools injured.

COURSES IN DOMESTIC SCIENCE AND ARTS

DRESSMAKING AND SEWING

DRESSMAKING.—*First Grade.*—Monday and Thursday, or Tuesday and Friday. Fee, *three dollars.*

Second Grade.—Tuesday and Friday. The fee for the instruction is *five dollars*, but the drafting-chart, with which each student must supply herself, costs *three dollars.*

Third Grade.—Monday and Thursday. Fee, *five dollars.*

SEWING.—Wednesday. Fee, *three dollars.*

CAROLINE A. M. HALL, MARY E. EASTWOOD, MARY L. SARGENT, JENNIE COLLINGWOOD, MARY C. DAVIS, MARY H. BROWN, Instructors.

MILLINERY

FIRST COURSE.—Monday and Thursday. Fee, *three dollars.* SECOND COURSE.—Tuesday and Friday. Fee, *five dollars.*

CAROLINE L. T. BURGESS, EMILY G. SWETT, EMILY A. LITTLEFIELD, Instructors.

COOKERY

PRINCIPLES AND PRACTICE OF COOKERY.—*First Course,* Monday. Fee, *five dollars,* including all materials used.

A class in the *Second Course*, and a class for men in the *Use of the Chafing-dish* will be formed, if a sufficient number of students apply. **Fannie K. Wardell**, Instructor.

Course for Waitresses.—Thursday evening. Fee, *three dollars.*

COURSES IN ENGLISH LANGUAGE AND LITERATURE

FIRST CLASS

Language.—Review of essentials of English Grammar. Analysis and synthesis of sentences. Common errors. Punctuation. Figures of speech. Social and business forms of letter-writing.

Literature.—Selected readings in American classics: Hawthorne, Irving, Poe, Longfellow, Holmes, Lowell, Whittier.

Wednesday and Friday, at 7.30.

SECOND CLASS

Language.—Elements of rhetoric. Words: synonyms, barbarisms, improprieties, solecisms. Sentence-writing: unity, concord, emphasis, correlation; periodic, loose, balanced, long, short. Elements of style: force, rapidity, life, smoothness. Paragraph-writing: unity, coherence, development.

Literature.—Historical sketch of American literature. Selected readings in English classics: Old Ballads, Tennyson, Coleridge, Burns, Scott, Keats.

Monday and Thursday, at 7.30.

THIRD CLASS

LANGUAGE.—Rhetorical analysis: studies in style and invention, based on the critical study of selections from typical English and American writers. The studies also illustrate the processes of description, narration, exposition, argumentation, persuasion. Composition and criticism—special attention is given to both class and individual criticism of the student's original work. Proof-reading.

LITERATURE.—Historical sketch of English literature. Critical reading of selected plays of Shakespeare.

Monday and Thursday, at 7.30.

The work of the three classes is progressive, and pupils are advanced from the lower to the higher class *on examinations* at the close of each session, or during the session if their progress warrants it. Upon satisfactorily passing all the examinations prescribed for the Third Class, students receive the Certificate of the Institute.

Students may enter the class for which their previous study fits them.

The session extends from October 1 to March 30.

FEE.—*Three dollars* for each class, for the entire session of six months.

HARRIET L. MASON, in charge; ALICE M. BRENNAN, ISABEL J. ROBERTS, Instructors.

PHYSICAL TRAINING

CLASS FOR YOUNG WOMEN.—Wednesday and Friday. MAUDE G. HOPKINS, Director. Fee, *three dollars*.

CLASS FOR YOUNG MEN.—Tuesday and Thursday. J. PETERSON RYDER, S. B., Director. Fee, *three dollars*.

ENROLMENT

Students who have previously attended the Evening Classes and are entitled to promotion will be enrolled on Wednesday, September 27, at 7.30 p. m., or on any day before that date, from 9 a. m. to 4 p. m. Students holding promotion cards should present them on the date of enrolment.

The enrolment of new students will take place on Thursday, September 28, and Friday, September 29, at 7.30 p. m. It is important that all new applicants should be enrolled on these evenings.

The classes will begin work on Monday, October 2.

FEES

Fees must be paid on the evening of enrolment, at the office of the Registrar, when tickets of admission to the courses will be issued.

Students attending the Drawing, Science, and Physical Training Classes are required to make a deposit of *fifty cents*, as security for the return of the locker keys.

Lockers, with individual combination locks, for coats and other property, are provided for men students, at a rental of *twenty-five cents* for the entire session.

Men students using the coat-room for their coats and other property do so at their own risk, and the Institute will not be responsible for loss or damage to the same.

A storage-room for bicycles, in the basement, is provided free of charge. An individual check for each bicycle is given by the attendant. Bicycles are received and delivered at the storage-room only between 7 and 9.45 p. m.

FREE CLASSES IN CHORAL MUSIC

Charles M. Schmitz, Director; James M. Dickinson, Accompanist.

The instruction in choral music is organized as follows:

I. The Drexel Chorus; II. The Choral Class.

I. The Drexel Chorus.—The Drexel Chorus is composed of men and women desirous of devoting themselves to the study and rendition of choral works by the great masters. The Chorus meets in the Auditorium where the grand organ is available in connection with the training.

The meetings of the Chorus extend over a session of six months, beginning October 9th and closing the end of March. The Chorus meets weekly on Monday, at 8 p. m.

Two public concerts are given, one about Christmas and the other at the close of the session.

Ability to read music fairly is required for admission.

Former members of the Drexel Chorus are entitled to admission without further musical examination.

II. The Choral Class.—The Choral Class is for young men and young women who are desirous of studying choral music under such conditions as will lead to their admission to the Drexel Chorus. An acquaintance with musical notation is desirable, but a willingness to devote the necessary time to vocal training in choral singing is the chief qualification for admission.

The class meets weekly in the Auditorium, on Wednesday, at 8 p. m., from October to March, inclusive. The first meeting will be on Wednesday, October 11th.

A public concert is given at the end of the session.

There is no charge for admission to the Drexel Chorus or to the Choral Class.

LIBRARY AND READING-ROOM

The Library and Reading-room are open to students and the public, every evening (except Saturday), until 10 p. m., from October to March, inclusive. Library cards may be obtained by students, on presentation of the class ticket.

MUSEUM AND ART COLLECTIONS

The department is supplied with an extensive collection of plaster casts, representative of the sculpture of the classic and Renaissance periods, and with valuable collections of drawings, designs, prints, and photographs. The collections of textiles, wood-carvings, metal-work, and ceramics in the Museum of the Institute are of great value in connection with the various lines of instruction. A collection of paintings bequeathed to the Institute by its founder, contains works by Meissonier, Bouguereau, Jules Stewart, Coignard, Dupray, Cesar de Cock, Boldini, Rico, Michetti, Madrazo, Jimenez, Ecüsquisa, Van Marcke, Gieryinski, Ridgway Knight, Richards, Hamilton, etc., etc.

FREE PUBLIC LECTURES AND CONCERTS

Free Courses of Lectures in Art, Science, and Technology and Free Organ Recitals are given during the winter months, beginning in November. Circulars giving full details are issued in October.

DEPARTMENT OF FREE PUBLIC LECTURES AND CONCERTS

The work of the department includes the Free Courses of Public Lectures and Concerts which are given during the winter months, beginning in November and continuing until the end of March. During the greater part of the season, a concert is given every Thursday evening. An idea of the place these lectures and concerts hold in the work of the Institute may be formed from the fact that the attendance during the season of 1898–99 was over thirty-six thousand.

The following are the programs of the Lectures and Concerts for the past season:—

LECTURES

Lecture on "The Nature and Influence of Music," by Mr. William L. Tomlins, New York.

*A course of four lectures on "The New Lands, Present and Prospective, of the United States," by Daniel G. Brinton, LL. D., D. C. S.

A course of three lectures on "The History, Religion, and Art of the Ancient Egyptians," by Mr. George S. Kellogg, Metropolitan Museum of Art New York.

Lecture on "Raphael's Rooms in the Vatican, with special reference to the Decorative Features," by Mr. Charles H. Caffin, B. A., New York.

Lecture on "A Night in the House of Commons with Gladstone," by Professor William H. Mace, Syracuse University.

A course of four lectures on "Contemporary French Literature," by Professor Jean Charlemagne Bracq, Vassar College.

A course of five lectures on "Household Economics," by Mrs. Helen Campbell.

*On account of the illness of Dr. Brinton, the course was postponed.

A course of six lectures on "Some Practical Applications of Human Physiology," by Professor Albert P. Brubaker, M. D., Drexel Institute.

Lecture on "The Fighting Ship of Yesterday and To-day," by Mr. Henry W. Raymond, Philadelphia.

Lecture on "The Nicaragua Canal, and its relation to the Political and Commercial Interests of the United States," by Professor Emory Richard Johnson, Ph. D., University of Pennsylvania.

Lecture on "Mt. Athos and Its Monks," by Professor Edwin A. Grosvenor, Amherst College.

Lecture on "Shakespeare at Home," by Mr. H. Snowden Ward, London, England.

A course of four lectures on "Representative Americans," by Edward T. Devine, Ph. D., New York.

Lecture on "The French Revolution," by Mr. Sidney Dickinson, Philadelphia.

CONCERTS

Organ Concert. Mr. Frederick Maxson, Philadelphia. Minnie Leahy Baer, Contralto.

Organ Concert. Mr. Minton Pyne, Philadelphia. Mr. Frederick E. Hahn, Violinist.

Organ Concert. Mr. Ellis Clark Hammann, Philadelphia. Madame Emma Suelke, Soprano.

Concert. Mr. James M. Dickinson, Organist Drexel Institute; and Instrumental Septet under the direction of Mr. Charles M. Schmitz, Director of Music, Drexel Institute.

Organ Concert. Mr. David Edgar Crozier, Philadelphia. Dr. George Conquest Anthony, Baritone.

Organ Concert. Mr. George Alexander A. West, Philadelphia. Miss Julia C. Plantholz, Contralto.

Organ Concert. Mr. Shephard K. Kollock, Philadelphia. Mr. Emil Schmidt, Violinist.

Organ Concert. Miss May Porter, Philadelphia. Miss Jennie Foell, Soprano.

Organ Concert. Mr. Irvin J. Morgan, Philadelphia. Mr. Charles J. Graf, Baritone.

Organ Concert. Mr. William C. Hammond, Holyoke, Mass. Mrs. Emma Osborne, Contralto.

Concert. Mr. James M. Dickinson, Organist Drexel Institute. Miss Jennie Foell, Soprano; Mr. Charles M. Schmitz, Cellist; Mr. Martinus Van Gelder, Violinist.

Organ Concert. Mr. S. Tudor Strang, Philadelphia. Miss Anna Elizabeth Kelley, Contralto.

Organ Concert. Mr. James M. Dickinson, Organist Drexel Institute; and Instrumental Septet under the direction of Mr. Charles M. Schmitz, Director of Music, Drexel Institute.

The following concerts were given by the Drexel Chorus:

Christmas Concert. Oratorio of the Prodigal Son; music by Sir Arthur Sullivan. Soloists—Miss Jennie Foell, Soprano; Minnie Leahy Baer, Contralto; Mr. Owen Roberts, Tenor; Mr. Charles J. Graf, Baritone. Mr. James M. Dickinson, Organist; Mr. Louis Volmer, Pianist.

Easter Concert. Cantata, "The Lay of the Bell." Poem by Friedrich Schiller; translation by the Rev. J. Troutbeck, D. D.; music by Andreas Romberg. Soloists—Miss Margaret H. Elliott, Soprano; Mr. James Y. Glisson, Tenor; Mr. Henri G. Scott, Bass. Mr. James M. Dickinson, Organist; Mr. Louis Volmer, Pianist.

Annual Concert by the Choral Class, under the direction of Mr. Charles M. Schmitz, Director of Music, Drexel Institute. Florence Walton Mackenzie, Soprano. Mr. James M. Dickinson, Organist.

LIBRARY DEPARTMENT

STAFF

ALICE B. KROEGER,
Librarian, and Director of the Library School.

SARAH W. CATTELL,
Assistant Librarian, and Instructor in the Library School.

—————————— ,
Assistant Librarian, and Instructor in the Library School.

MARY HEY SHAFFNER,
Assistant in Charge of Circulating Department.

FRANCES C. PORTER,
Evening Assistant.

MARY S. OLIVER,
Library Attendant.

The Library of the Institute was opened on December 17th, 1891, with two thousand eight hundred volumes. The chief purpose of the Library, from the beginning, has been to supplement the work of the several departments of the Institute by a good collection of books representing the various subjects pursued as studies. In addition to its use by students and instructors, it is free to all residents of Philadelphia for reference and for the home use of books.

The Library is supported by an annual appropriation from the endowment of the Institute. During the lifetime of the founder, Mr. Anthony J. Drexel, the books were, for the most part, purchased by him for the Library. He also presented many fine books from his private collection.

The Library and Reading-room are open every day, except Sundays and legal holidays, from 9 a. m. to 6 p. m., and during the sessions of the Evening Classes, from 9 a. m. to 10 p. m.

The Library now comprises twenty-four thousand volumes. The books are classified by the decimal classification and arranged in the alcoves to which the readers have free access. The dictionary card catalogue, for public use, is made as complete as possible by means of references and analyticals. The shelf-list is on cards forming a classed catalogue for official use.

RELATION OF THE LIBRARY TO THE DEPARTMENTS

All books and periodicals are under the management of the Library Department, but every privilege is granted to professors and students in their use of the books. The departments of the Institute have no special libraries. Each instructor can draw from the Library an unlimited number of books which are used in the departments as daily tools. In addition to these books, the professors are given space and tables in the alcoves for "reserved" books, which include such books as the students are required to use constantly. These cannot be circulated outside the Library except over night. In such courses as decoration and architecture, a large number of the fine art books are taken to those department rooms by the directors, and kept during a term. Constant use is made of these privileges, and the Library is thus brought into close relation with the several departments.

READING-ROOM

The Reading-room of the Institute has on file one hundred and eighty periodicals and a few daily newspapers. The Reference Department, containing the books which are strictly "reference" in character, is placed in one part of the Reading-room, easily accessible to all. One of the most useful books in this department is the *édition de luxe* of "A Library of the World's Best Literature," a gift from Mr. George C. Thomas and Mr. James W. Paul, jr. The bound volumes of the general magazines are also shelved in a special alcove. The George W. Childs collection of manuscripts forms one of the chief attractions of the room.

PUBLICATIONS

The only publication of the Library has been a series of Reference Lists, issued irregularly, of which three numbers have appeared: No. 1, Costume; No. 2, Music; No. 3, Decoration and Design. These are sold at a nominal price.

SPECIAL COLLECTIONS

1. THE ANTHONY J. DREXEL BEQUEST consists of the private library of the founder of the Institute, bequeathed by him to the Library (1893). It comprises editions of the standard English and American authors.

2. THE GEORGE W. CHILDS COLLECTION OF MANUSCRIPTS AND AUTOGRAPHS, collected by the late Mr. George W. Childs during his lifetime, and presented by him to the Library in December, 1891, consists of valuable original manuscripts of modern authors and autograph letters of noted persons. Among the treasures of the collection are:

The original manuscript of Dickens's "Our Mutual Friend," bound in two volumes, closely written, as it was sent to the printer, with innumerable erasures and insertions; an autograph manuscript of Thackeray's "Lecture on George III.," handsomely bound and extra-illustrated with portraits and original drawings and water-colors by Thackeray (this is the copy from which he read when he lectured in America); the original manuscript of Poe's "The Murders in the Rue Morgue;" of Lamb's "Essay on Witches and other Night Fears," signed Elia; of Bremer's "Hertha;" of Godwin's "Cloudesley, a Novel;" of André's "The Cow Chace," and of many other important works. The autograph letters comprise, among others, a set of letters from the Presidents of the United States; the Pinkerton correspondence (in four volumes), including letters from many noted Englishmen, of the latter part of the eighteenth century, to John Pinkerton; and collections of miscellaneous letters written by English and American authors and statesmen.

3. THE CHARLES H. JARVIS MEMORIAL LIBRARY OF MUSIC, presented in 1896 by the daughters of the late Mr. Jarvis, an eminent Philadelphia musician. It comprises a collection of more than one thousand bound volumes of music, including the piano and orchestral works of many of the classical composers. This musical library is handsomely housed in a room at the rear of the library, with a special author and classed card catalogue, bringing out, so far as possible, the contents of each volume under authors and subjects. An addition to the Library of Music was made in 1897 by the presentation of the musical collection of the sister of Mr. Jarvis, the late Mrs. Helen Jarvis Davis. The latter collection consists

of many volumes upon musical subjects and a large number of unbound compositions. It was presented by her son, Mr. Charles H. Davis. The Musical Library is for reference only.

4. THE GEORGE M. STANDISH COLLECTION. A valuable gift made to the Library in 1898, by an American gentleman who has resided in Italy for many years. The collection comprises his personal library gathered during this time, and is made up of examples of early printed books (some of them before 1500), rare works on art, architecture, and antiquities, fine editions of the Italian classics, a large, number of English books on art, literature, and history, dictionaries, prints, photographs, and drawings. A special alcove, suitably inscribed, is set apart for the collection, to which access is given on application to the Librarian.

5. COLLECTION OF PHOTOGRAPHS AND PRINTS. The Library has now a collection of about two thousand mounted photographs, largely of architectural and decorative subjects. These are classified and catalogued. In addition to this collection of photographs, the Library has received, as a gift from Mr. George C. Thomas, a series of valuable etchings of Ancient Paris and a series of photographs of Old London. One of the most interesting and artistic possessions of the Library is a collection of Japanese prints, in color, by famous Japanese artists. This is a gift of Mr. James W. Paul, jr., President of the Board of Trustees. Additions are constantly being made to the collection.

6. COLLECTION OF LANTERN SLIDES. This collection now includes twenty-five hundred slides and is being constantly increased. It is classified and catalogued.

FINE ART BOOKS

The Library possesses a very fine collection of books on the fine arts, embracing many handsomely illustrated volumes. Among those of special interest are:—

ONGANIA.—Basilica of St. Mark's at Venice, 16 vols., folio.

ONGANIA.—Streets and Canals of Venice, folio.

WALTON.—Art and Architecture at the World's Fair, 10 vols., folio.

AUSTRIAN COMMERCIAL MUSEUM.—Oriental Carpets, 10 parts, folio.

COLE.—Old Italian Masters (*édition de luxe*), folio.

DRESDEN Gallery, folio.

JONES.—Alhambra, 2 vols., folio.

RACINET.—Le costume historique, 6 vols., folio.

RACINET.—L'ornement polychrome (plates, mounted), folio.

BOOK of Common Prayer, Revised (limited edition with elaborately decorated borders).

ARMY and Navy of the United States, 10 parts, folio.

FORMA URBIS ROMAE.—The great Atlas of the City of Rome by Rodulphus Lanciani, begun in 1893 and still unfinished.

DONORS

Among those who have given largely to the Library, besides the founder, are: Mr. James W. Paul, jr., Mr. George W. Childs Drexel, Mr. John R. Drexel, Mrs. George W. Childs, Mr. George C. Thomas, Mr. Joseph G. Rosengarten, Mr. Clarence S. Bement, the late Mr. George W. Childs, and the late Mrs. J. Dundas Lippincott.

MUSEUM DEPARTMENT

MARY T. MAC ALISTER, Curator.

The formation of a museum of fine and industrial art was part of the original scheme for the Institute as approved by its founder. The object was to place within the walls of the Institute such art collections as would be of value in connection with the various lines of instruction, and would also serve as a museum for the general public. The founder's deep interest in this project was shown by the gifts he made to the Museum during his lifetime, and by the bequest of his pictures and other art objects belonging to him at the time of his death. The intentions of the founder have been generously seconded by members of his family and others. With the exception of a few purchases made at the close of the Columbian Exposition at Chicago, in 1893, the Museum as it now stands has been built up wholly by gift. The beginning of the collections was made in London, in 1890, with the kind co-operation of the late Sir Philip Cunliffe Owen, Director of the South Kensington Museums, and Mr. Purdon Clarke, at that time Keeper of the India Museum. These original purchases, consisting of textiles, furniture, ceramics (chiefly oriental), wood-carvings, metal-work, and oriental embroideries, are of great interest and permanent value.

The installation of the Museum is unsurpassed by that of any museum in the United States. The cases have been made from designs furnished by Sir Philip Cunliffe Owen, and are of the finest quality and well adapted to the display of the collections which they contain.

The growth of the Museum has been so rapid that it has not been deemed advisable thus far to print a general catalogue of the collections. A handbook, however, is in course of preparation, which will be a useful aid to visitors.

The accommodations of the large room originally appropriated to the Museum were found to be insufficient four years ago, necessitating the distribution of many of the finest collections throughout the court, corridors, and rooms of the Institute building. This had also to be done with the collection of paintings which, under the circumstances, are not seen to the best advantage.

The chief collections in the Museum are as follows :—

1. The collection of European Textiles, dating from the fourteenth to the eighteenth century inclusive, presented by the founder of the Institute.

2. The collection of India Printed Fabrics, presented by the founder of the Institute.

The two preceding collections are displayed in the galleries surrounding the court and in rooms in various parts of the building.

3. Collections of European Bronzes, Ceramics, etc., presented or bequeathed by the founder of the Institute.

4. A collection of paintings embracing examples by Meissonier, Bouguereau, Jules Stewart, Coignard, Dupray, Boldini, Rico, Michetti, Madrazo, Jimenez, Ecũsquisa, Van Marcke, Gieryinski, Ridgway Knight, Richards, Hamilton, etc., bequeathed by the founder of the Institute.

5. The Memorial Collection to Mrs. Anthony J. Drexel, made by her daughter, the late Mrs. James W. Paul, jr.,

consisting of ceramics, metal-work, wood-carvings, and Italian ecclesiastical embroideries of the sixteenth and seventeenth centuries.

6. The Memorial Collection to Mrs. James W. Paul, jr., presented by her husband, consisting of laces, a magnificent pair of Meissen candelabra (formerly belonging to the late King Ludwig II. of Bavaria), a fine seventeenth century Flemish tapestry, the Doulton Mermaid Vase, a collection of Phenician glassware, etc.

7. A collection of Royal and Imperial Sèvres Ware, presented by Mr. John H. Harjes, of Paris.

8. A collection of Egyptian Antiquities, presented by Colonel Anthony J. Drexel, representative of the arts and life of the ancient Egyptians. This collection was made for the Institute by Emil Brugsch Bey, Keeper of the Egyptian Museums at Boolak.

9. A collection of Ivories (European and Oriental) presented by the late George W. Childs.

10. A collection of Engravings and Etchings, embracing examples of work chiefly by the French, English, and German masters, presented by the late George W. Childs.

11. A collection of Japanese Ceramics, presented by Dr. Edward H. Williams.

12. A collection of Laces, Oriental Embroideries, Artistic Jewelry, Ceramics, and other articles of artistic or historic interest, presented by Mrs. George W. Childs.

13. A small collection of Tanagra Figurines, presented by Colonel Anthony J. Drexel.

14. A Memorial Collection of Ceramics, Metal-work and Embroideries to the late Lieutenant Allan G. Paul, U. S. N., presented by his family.

15. A collection of Ivories and Ceramics, presented by Mrs. Joseph W. Drexel.

16. A collection of Persian, Moorish, and Arab Arms, presented by Colonel Anthony J. Drexel.

17. A collection embracing some fine examples of Japanese Lacquer and Bronze Ware, an ancient German Clock, small jeweled and enameled clocks, etc., presented by Mrs. John R. Fell.

18. A collection of colored plaster reproductions of the interior of the Alhambra, a piece of early French Gothic sculpture, and two paintings, presented by Mr. John A. Johann.

19. A collection of paintings, fire-arms, ancient furniture, textiles, wood-carvings, and ceramics, presented by Mr. George M. Standish.

20. Gifts to the Museum have also been made by Mr. John R. Drexel, Mr. George W. C. Drexel, Mr. Joseph G. Rosengarten, the late Mrs. Sarah Howard Peterson, the Estate of William H. Rawle, Messrs. Bailey, Banks & Biddle, the late Mr. Howard Potter of New York; Mrs. Thomas K. Conrad, Mrs. Catherine A. Howell Flourney, and Mr. William Struthers.

21. There is a good collection of plaster casts, representative of the sculpture of the Classic and Renaissance periods, which is placed in the art studios.

There are other art collections, such as the Collection of Japanese Prints, which are kept in the Library of the Institute.

The Museum is open free to the public, daily (except on Sundays), from 9 a. m. to 6 p. m., and during six months of the year (from October to March, inclusive) until 10 p. m.

CALENDAR

1899-1900

FIRST TERM begins Monday, September 18.

SECOND TERM begins Thursday, February 1.

EVENING CLASSES begin Monday, October 2. Session closes Friday, March 30.

COMMENCEMENT, Friday, June 8.

EXAMINATIONS FOR ADMISSION, Thursday and Friday, September 14 and 15, 1899, and Monday and Tuesday, June 11 and 12, 1900.

EXHIBITIONS OF WORK of the various Departments begin Monday, May 14, and continue for four successive weeks. The Exhibition of the Evening Classes is held at the close of the Session.

HOLIDAYS

THANKSGIVING DAY until the following Monday.

CHRISTMAS HOLIDAYS, Saturday, December 23, to Tuesday, January 2, inclusive.

WASHINGTON'S BIRTHDAY, Thursday, February 22.

EASTER HOLIDAYS, Thursday, April 12, to Monday, April 16, inclusive.

MEMORIAL DAY, Wednesday, May 30.

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